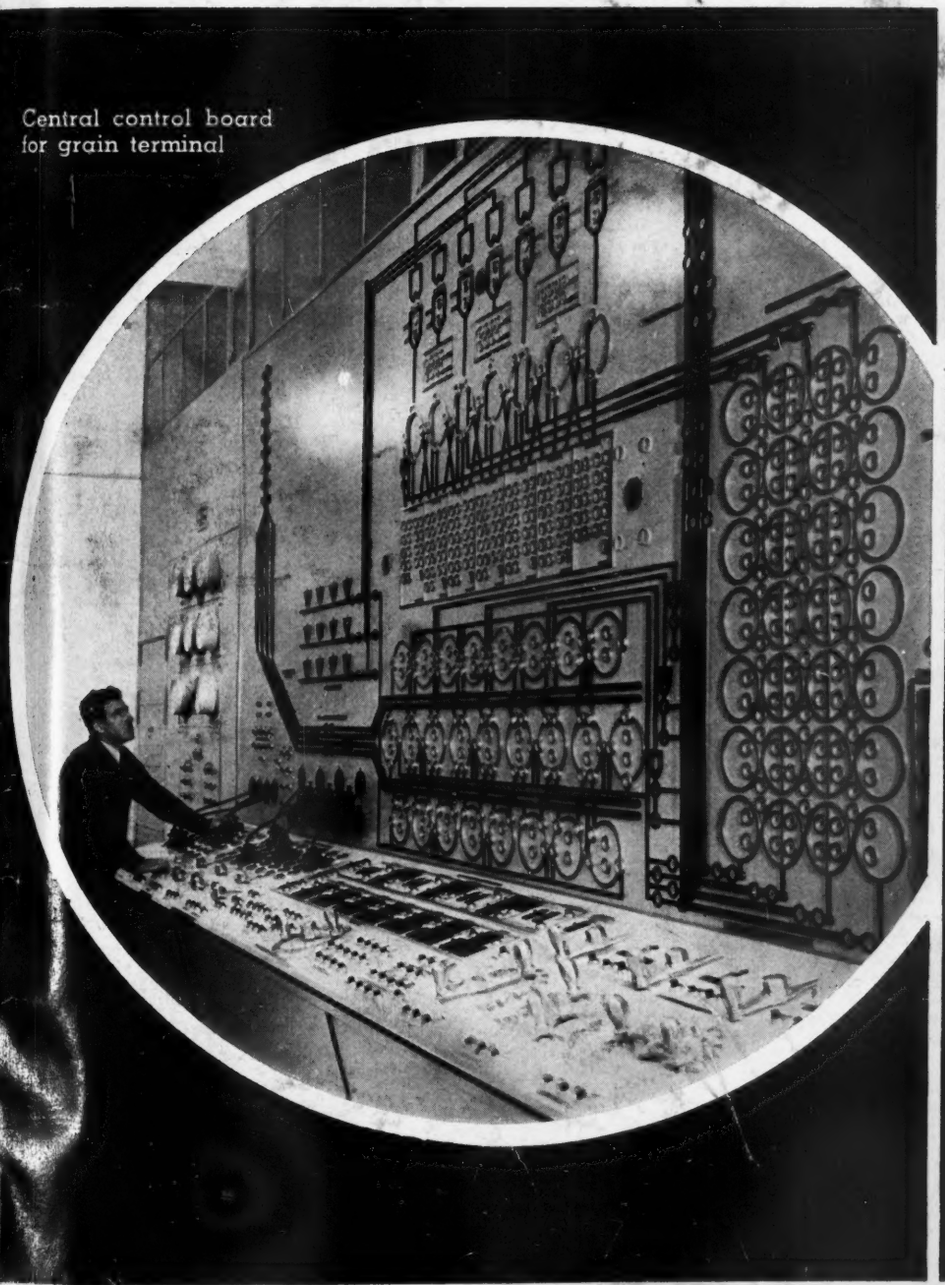
EAST ENGINEERING LIBRARY

FOOD INDUSTRIES

APR 17 1948

NATIONAL EDITION

● FOR THOSE WHO CONTROL QUALITY THROUGH MANAGEMENT AND PRODUCTION



Central control board for grain terminal

APRIL 1948

WINE MAKING IN CALIFORNIA

Producing "MSG", Savoring Agent

New Techniques For Citrus Concentrate

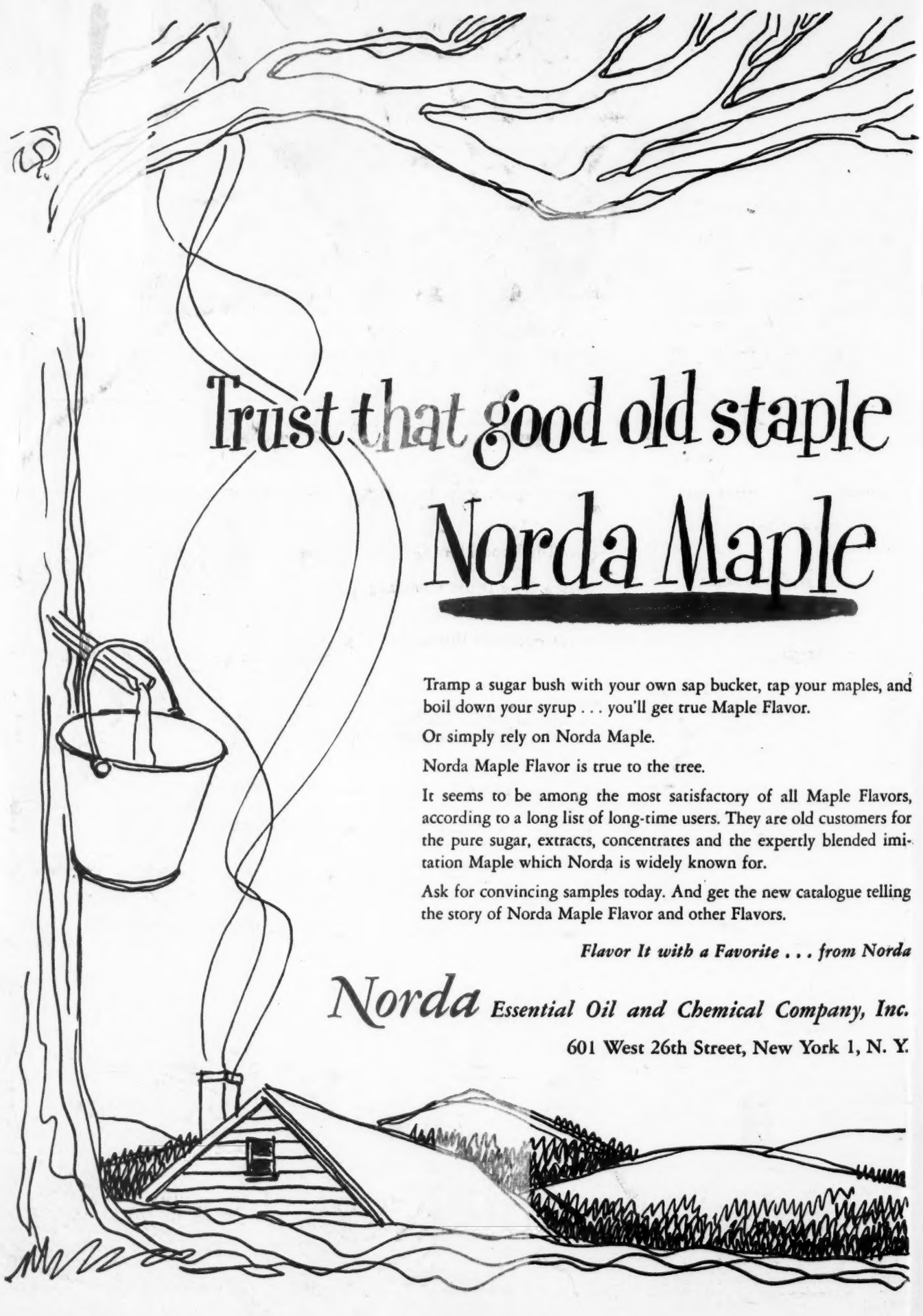
How to Temper Chocolate

Heat Economy Program Saves Fuel

Visualization Used In Bakery Design

Weight Control In Packaged Desserts

McGRAW-HILL PUBLICATION



Trust that good old staple

Norda Maple

Tramp a sugar bush with your own sap bucket, tap your maples, and boil down your syrup . . . you'll get true Maple Flavor.

Or simply rely on Norda Maple.

Norda Maple Flavor is true to the tree.

It seems to be among the most satisfactory of all Maple Flavors, according to a long list of long-time users. They are old customers for the pure sugar, extracts, concentrates and the expertly blended imitation Maple which Norda is widely known for.

Ask for convincing samples today. And get the new catalogue telling the story of Norda Maple Flavor and other Flavors.

Flavor It with a Favorite . . . from Norda

Norda ***Essential Oil and Chemical Company, Inc.***

601 West 26th Street, New York 1, N. Y.

CHICAGO • LOS ANGELES • ST. PAUL • MONTREAL • TORONTO • HAVANA • MEXICO CITY • LONDON

FOOD INDUSTRIES

FOR THOSE WHO CONTROL QUALITY THROUGH MANAGEMENT AND PRODUCTION

APRIL, 1948 Volume 20, Number 4

SPECIAL FEATURES

Progress Takes A Two-Man Team.....*By F. K. Lawler* 69
Free Nations And ERP..... 71
"M.S.G.," Savoring Agent, Made In Special Chemical Plant *By Paul D. V. Manning* 72
For Greater Service To The Food Industries..... 124

ENGINEERING

Improved Citrus Concentrate Depends on Advanced Techniques *By J. L. Heid and C. G. Beisel* 78
The McEvoy Polyphase Freezer.....*By Alice M. Wilson* 100
Heat Economy Program Saves Fuel in Salt Plant *By Frank W. McCarthy* 102
Grain Under Control..... 110
Visualization: New Tool Used In Designing Bakery Layout..... 114

SANITATION

How The Food Plant Can Use A Sanitation Rating System — Part II *By Mohe H. Solworth* 82
Device Cuts Drum Cleaning Costs..... 109

FOOD INDUSTRIES REPORT

How California Wines Are Made *By W. V. Cruess and C. R. Havighorst* 85

PRODUCTION

How To Temper Chocolate.....*By William G. Wolfe* 93
Powdered Ice Cream Mix.....*By W. J. Corbett* 96
Fried Bacon Rind Strips Win Acceptance In South..... 108

PACKAGING

Will We Follow Europe In The Use Of Aluminum Cans? *By John V. Ziemba* 94
Weight Control In Packaging Gelatin Desserts.....*By Keith A. Fitch* 112

PLANT SERVICES

Food Freezers Require Proper Lubrication.....*By A. F. Brewer* 116

QUALITY CONTROL

Yeast Estimation Methods: When And How To Apply Them *By Earl D. Stewart* 119

DISTRIBUTION

Trailers For Curb Sales..... 122

EVERY MONTH

Editorials .....69 and 125
The Talk of the Industry 70
Automotive 122
New Packages and Products 128
Food Industry News 137
Changes in Food Supplies 161
What Washington Thinks 162
Men, Jobs and Companies 165
Food Equipment News 172
Reader Service Coupons 189
Catalogs and Bulletins 192
Food Technology—Abstracts 199
Books 215
Patents 219

H. A. Williamson.....Publisher
Sidney D. Kirkpatrick.....Acting Editor
Frank K. Lawler.....Executive Editor
Haldane Gee .....Managing Editor
E. S. Stateler.....Associate Editor, Chicago
C. R. Havighorst, Associate Editor, San Francisco
J. A. J. Jones.....Assistant Editor
Arthur V. Gemmill.....Assistant Editor
John V. Ziemba.....Assistant Editor
Priscilla A. Deutsch.....Art Editor
Alice M. Wilson.....Reader Service
George E. Doying, Jr.....Washington, D. C.
S. T. Henry.....Spruce Pine, N. C.

CONSULTING EDITORS

Laurence V. Burton.....New York
R. S. McBride.....Washington, D. C.

WORLD NEWS

John Chapman.....Director

ECONOMICS BOARD

Dexter M. Keezer.....Director

DISTRICT MANAGERS

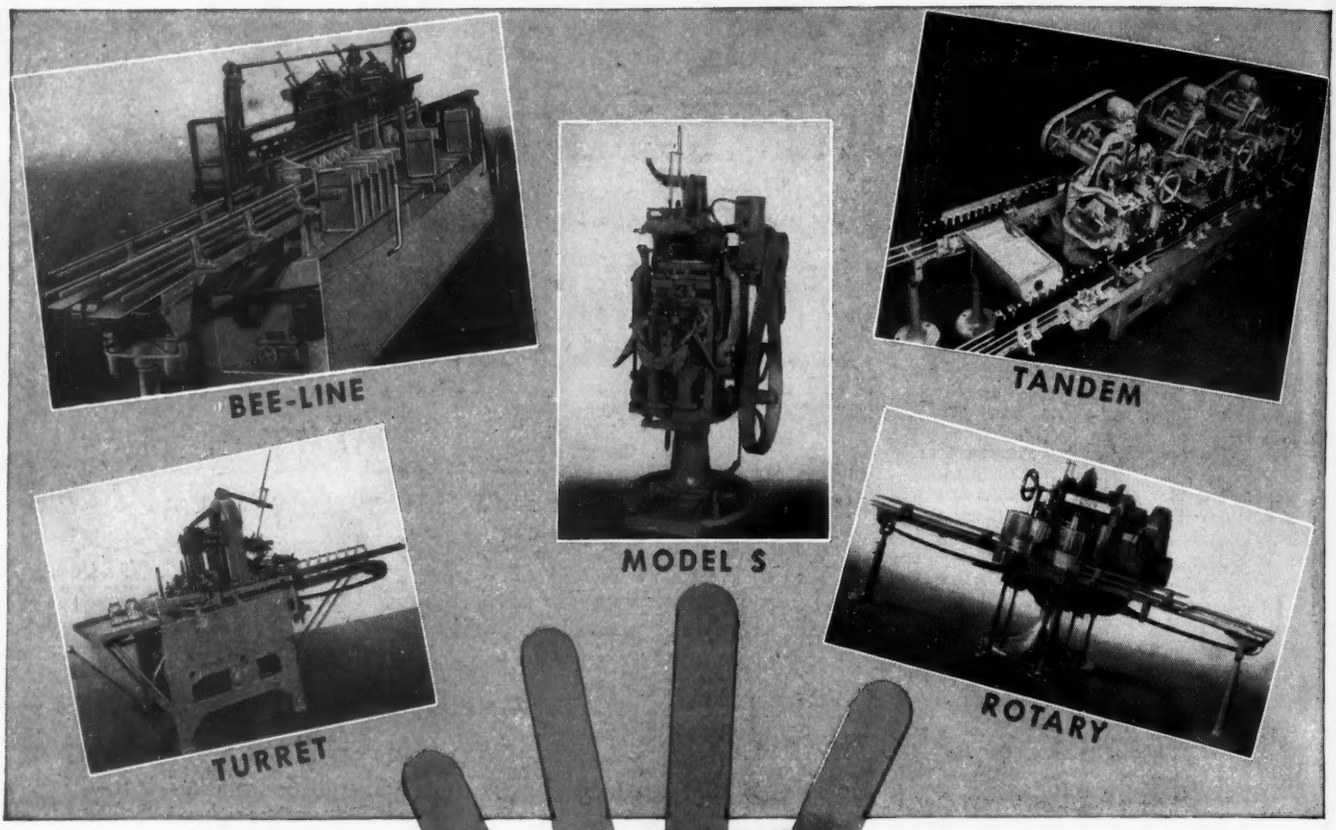
NEW YORK 18.....A. G. Sutherland
330 W. 42nd St. Longacre 4-3000
BOSTON 16.....W. Donald Boyd
1427 Statler Bldg. Hubbard 2-4911
ATLANTA 3.....Ralph Maultsby
1311 Rhodes Haverty Bldg. Walnut 5778
CLEVELAND 15.....Thomas E. Taylor
1510 Hanna Bldg. Main 3981
DETROIT 26.....H. P. Ruprecht
2880 Penobscot Bldg. Randolph 1793
CHICAGO 11.....Grahame E. Riddell
520 N. Michigan Ave. Whitehall 7900
PHILADELPHIA 3.....Edward A. Martin
17th and Sansom Sts. Rittenhouse 6-0670
ST. LOUIS 8.....G. G. Sears
3615 Olive St. Lucas 4867
SAN FRANCISCO 4.....J. W. Otterson
68 Post St. Douglas 2-4600
LOS ANGELES 14.....Roy Phelan
621 S. Hope St. Michigan 3873
SALES MANAGER, L. E. Crist

THE COVER

ONE MAN directs the flow of 4,000,000 bu. of grain, in and out of the wheat terminal at Geelong, Australia. He is guided by a system of lights on the plant layout in front of him. Additional information on this terminal appears on page 110.

FOOD INDUSTRIES is published monthly. Price 35c per copy. PUBLICATION OFFICE: 330 West 42nd Street, New York 18, N. Y., application for entry as second class matter in New York, N. Y., is pending under the act of March 3, 1879. Subscription rates: United States and possessions, $3.00 a year, $4.00 for two years, $5.00 for three years. Canada, $4.00 a year; $6.00 for two years; $8.00 for three years (payable in Canadian or U. S. Funds). Pan American countries $5.00 for one year, $8.00 for two years, $10.00 for three years. All other countries, $15.00 a year, $25.00 for two years, $30.00 for three years. Return postage guaranteed. Please indicate your position and company connection on all subscription orders. FOOD INDUSTRIES invites subscriptions only from the following: executives, engineers, technologists and operating supervisors in food processing companies, and from consultants and laboratories whose field includes food processing. McGRAW-HILL PUBLISHING CO., INC., James H. McGraw, (1860-1948), Founder. EDITORIAL AND EXECUTIVE OFFICES: 330 West 42nd St., New York 18, N. Y. BRANCH OFFICES: 738-9 Oliver Bldg., Pittsburgh 22; Aldwych House, Aldwych, London, W. C. 2: Washington 4. JAMES H. McGRAW, Jr., President; CURTIS W. McGRAW, Senior Vice-President and Treasurer; JOSEPH A. GERARDI, Secretary; NELSON BOND, Director of Advertising; EUGENE DUFFIELD, Editorial Assistant to the President and J. E. BLACKBURN, Jr., Vice-President (For Circulation Operations). CABLE ADDRESS: "McGraw-Hill, N. Y." Member A.B.C. Contents indexed monthly in Industrial Arts Index.

Copyright 1948, by McGraw-Hill Publishing Co., Inc.—All rights reserved.



FIVE KINDS OF LABELERS— WHICH IS THE BEST IN THE WORLD FOR YOU?

BEE-LINE— the high production, full automatic WORLD Labeler that is used for clean, precise, quality application of hundreds of famous labels in the food, condiment, wines and spirits, pharmaceutical and other industries. Applies front labels, front and back labels, and neck labels if desired, to round, square, oval, flat or panel containers. Production up to two a second.

TURRET— for automatic, continuous, low cost labeling that is worthy of the finest products packed in glass. Handles tumblers, jars and bottles from 2 to 4 ins. diameter, 3 to 13 ins. high. Applies body labels and, when desired, neck labels, all around neck wraps or foil. Production range from 60 to 140 per minute.

TANDEM— for efficient high production labeling of brewery and soft drink bottles or round jars. Designed to meet expanding production needs with maximum economy at any desired rate from 75 to 300 bottles per minute.

ROTARY— for dependable low cost label application to round bottles or jars of all types and sizes from 4 oz. or less to 32 oz. or more. Applies body labels, body and neck labels, or body labels, neck labels and foil in one operation up to 85 per minute.

MODEL S— the Semi-Automatic Labeler for applying body labels, all-around labels, neck labels and foil — any or all — to any size container from tiny vials to gallon jugs. Ideal for those with a variety of label or container sizes and shapes. Designed for rapid change-overs and fast operation even by unskilled operators.

WRITE FOR BULLETINS containing complete descriptions and pictures of any or all of the five; or, better still, send us samples of your glass containers and labels and tell us production requirements and we'll make recommendations and estimates.

"YOU GET THE BEST LABELERS IN THE WORLD"

ECONOMIC MACHINERY COMPANY

Builders of World Automatic and Semi-Automatic Labelers for Every Purpose

WORCESTER, MASSACHUSETTS

New York Philadelphia Pittsburgh Chicago San Francisco Los Angeles Denver Louisville Salt Lake City El Paso Seattle Portland Phoenix London Montreal Toronto Winnipeg Newfoundland Vancouver Mexico City Sydney, Australia Wellington, N.Z. San Juan, P.R. Ciudad Trujillo, D.R. Honolulu, T.H.

Why You Cannot Get Ahead As Your Father Did —

THE UNITED STATES is being forced toward socialism by a tax revolution of far-reaching consequences.

We have not yet felt fully the deadly impact of this revolution because inflation and the postwar boom have delayed its effects.

But from now on, more and more people will feel its bite. Already it is the dominant element in our economic life. Already it is the major factor in our chances of keeping our jobs and of getting ahead.

Here are some pertinent facts on this tax revolution:

1. The tax load that our nation can safely carry has long since passed the danger point.

Our capitalistic system is in real danger when taxes take more than 20 percent of our national income (or 20¢ out of every income dollar). Beyond that point there are not sufficient dollars left in private hands for capitalistic America to raise the capital required to keep its industry going. So we are right now being nudged further and further into socialism.

For today taxes take *twenty-five* percent of national income (or 25¢ out of every income dollar).

2. The tax revolution has undercut the incentives that help us to get ahead.

The group whose incomes range from $5000 up now turns over about one-half of its *total* income to federal, state, and local tax collectors. Before the war, this group gave the tax collectors one-third of its collective income.

In sharp contrast, the group of people with incomes under $5000 pays the tax collectors 20% of its income for direct and hidden (mostly hidden) taxes—against 18% before the war. This lower-bracket group needs immediate tax relief but I believe most sincerely that persons earning less than $5,000 have a very vital reason for also supporting tax relief in the much more heavily hit upper brackets.

As you get ahead, you expect your taxes to go up. Taxes should be levied, in principle, according to ability to pay. But today tax rates rise so sharply that they virtually destroy all incentives to get ahead, to save, and to invest in new and untried enterprises that open up new jobs. *The progressive tax idea now carried to punitive extremes has become a destructive tax revolution.*

Today the U.S., envied by all the world for the wealth it has won under capitalistic incentives, has cut its incentives below those offered by that state whose police methods strike terror into the hearts of all workers.

Soviet Russia rewards successful managers, writers, and scientists better relatively than we do under our present tax system.

A revolution that sweeps away incentives will quickly sweep away our free enterprise economy. The only substitute ever found for free incentives is the whip-and-lash compulsion of the police state. And no police state has ever been able to match the production of a free people with a free economy that gives adequate rewards to individual producers.

3. The tax revolution hits squarely the average American's chances of keeping a job and of getting ahead.

If you make less than $5000 a year you may well ask why you should worry about a tax revolution that seems directed at the comparatively small group, about 10% of American families, who make $5000 a year or more.

The answer, it seems to me, is that "risk capital," the money that makes new jobs when invested in growing companies or in new businesses, must come largely from the people making more than $5000 a year. The others usually cannot afford to take any risks with their savings.

It was the savings of this 10% group that made possible the huge growth in American industry and American jobs and our progress in raising American living standards in the years before 1930.

Now the government is taking so much from the 10% group in taxes that they cannot afford to risk any savings they manage to accumulate. Most of their savings now go to insurance companies and savings banks which are barred by law from making risky investments or investments even in seasoned common stocks.

The flow of risk-capital from this 10% group can only be renewed by reducing their taxes. The result will benefit everyone over the difficult years to come by providing more and steadier employment for all.

The cost of the presently proposed reduction, *less than 1% of the national income,* can well come out of current revenue surplus. It will be repaid many-fold by the new enterprises it will stimulate.

4. Jobs will be lost if risk-capital does not increase.

Unless the flow of risk-capital into business *can be doubled* and *trebled* in the next few years, business investment in job-making new plants and equipment will drop sharply. The McGraw-Hill survey of prospective capital expenditures, reported in the previous editorial in this series, made that quite clear.

When such a drop in business investment has come in the past, it has brought with it a general slump in business — and unemployment.

As we work through the enormous demand for goods of all kinds built up during the war years, and as the war-accumulated savings of businesses and individuals are spent, it will be harder and harder to keep production and employment at today's high levels.

Then—at the very time that we shall need all our drive to maintain prosperity—we shall be hit by the full impact of the tax revolution.

5. Compounding these troubles is a tax system as out-of-date as an oxcart.

Twenty years ago, when taxes took only twelve cents out of the national income dollar, our rattle-trap tax system was little more than a nuisance. Today, when it takes twice as big a bite, its double-taxing of the earnings of investors, its discriminatory excises, and the overlapping of federal, state, and local levies are a fatal handicap. A new system, a fair system, a rewarding system, is a necessity if American initiative and enterprise are to have a fair chance.

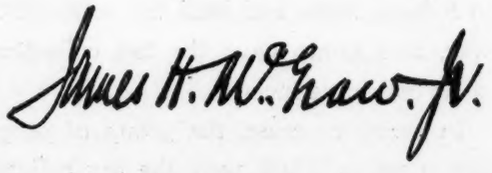
What Congress does now about federal taxes will bear crucially on our ability to sustain prosperity.

By demanding economy in government and by re-designing the tax system to stimulate initiative and risk-taking, Congress can multiply many times our chances of maintaining full employment and of raising living standards.

By allowing people to save more and by renewing the incentive to risk capital in new enterprises, Congress can actually insure a bigger tax return in the years ahead. More business will result — and pay more taxes.

That is the only way that a free people with a free economy can carry the tax load.

That is the best way that our government can improve our chances of keeping our jobs and of getting ahead. I suggest that you discuss these vital matters with your chosen representatives in Congress, in your state government, in your local community.



President, McGraw-Hill Publishing Company, Inc.

THIS IS THE 66TH OF THE SERIES

Progress Takes Two-Man Team

THERE lies ahead of the food processing industries a new period of progress. This period will see more intensive application of advanced plant engineering practices, along with new developments in process and unit-operation engineering.

The pressure of a great world demand for foods and increased agricultural production through new scientific methods and more efficient equipment will be driving forces behind this new phase of food processing progress. The accelerating effect of the rapid advancement occurring in nearly all major fields of industrial and technical endeavor will abet the trend. The economic force of an unbalanced food-cost factor in the cost-of-living structure will add still more impetus.

Problem for Management

But if food processing is to maintain its respected position in the community of great basic industries, the greatest drive must come from within. This will require on the part of management a progressive attitude, a firm hand, and a determination to improve operations and processes, even if it does look difficult. It will take a viewpoint on the part of executives like that recently expressed by one of the nation's great industrial leaders when he made this challenging statement: "Certainly we can cut production costs still further. We must to lower prices and put a damper on inflation. We don't know how at the moment, but our engineers always have come up with new ideas in the past, and they can do it again."

That kind of pressure for progress on the part of management is a prime requisite in speeding food processing development. A second requirement is to provide the proper combination of technological and engineering brains in those food companies not already adequately staffed with professional personnel. Then management should put the problem of greater factory efficiency up to its technical men and refuse to take "no" for an answer.

Considerable Know-How Required

The technical know-how required to improve operations in the food plant is greater than that needed to do the job in many other industries. This is true because food technology, plus engineering, is involved in most food-plant operations. There may be various ways of making a process or operation more efficient from the viewpoint of throughput. But when the product is food, nothing can be done which impairs the delicate taste, appearance, texture, and nutritional values of the product. How relatively simple it would be if food were just so much crushed rock!

This is old stuff, of course, to food manufacturers. It is so old in fact that it is liable to become an obsession which causes the non-engineering minded technologist to be overcautious.

Two Heads Are Necessary

The prescription for this condition is a technologist-engineer team which appreciates the aims and ideas of each other and can work together in the conception and development of better methods. Or, if a processor is so fortunate as to have in his employ one of those rare technologist-engineers, then he may get along with a one-man team.

Some of the smaller companies may feel that they cannot afford a two-man technical team, or even a first-rate one-man team. These should remember that progress pays its own way — with handsome dividends.

In the past, the average food processor has leaned heavily upon equipment manufacturers for increases in production-line efficiency. While the food equipment designers do contribute much, they are not in a position to see all of the opportunities for improvement.

Anyway, a large part of the efficiency that can be engineered into food factory operations does not involve processing equipment. It has to do with general factory operations, ranging from power and steam utilization to materials handling.

Protect Profit Margin

The sooner more technologist-engineer teams are put to work in the food industries under a "we must do it" management philosophy, the quicker will food manufacturers be able to protect their profit margins in the face of pressure to reduce prices.

F K Lawler

EXECUTIVE EDITOR

The Talk of the Industry

• WE usually do not tell readers about our printing problems, but we can't hold back on this occasion. Type setting for this issue was interruped by printshop labor difficulties beyond our control. So the editors burned the midnight oil and rushed copy to another printer. Then type proofs were pasted up in page form and printing plates made. There may be irregularities in the pages, but—you received the magazine.

• ANY well managed food factory has a clean-up crew. It has organized in advance a technic for cleaning up unusual spills, overflows, and accidental messes. That is good.

But it is still better to have a spill-prevention plan. It should be somebody's job to study every spill, overflow, breakdown, and mess-causing accident. His job should be to find out why it happened and plan for prevention of recurrence.

The man named as "master of spill prevention" need not be the most highly trained person in the operating staff. But he ought to be the most diligent, most meticulous, and most resourceful man (or woman) available. His skill may save many times his wages and many frayed management nerves.

Stop 'em; don't mop 'em!

• IN case you may be wondering how Morris Sayre, President of National Association of Manufacturers, can spend so much time away from his regular job as president of Corn Products Refining Company, you should be advised that the company has given him a leave of absence for a year to carry on the NAM work.

• LAMBASTING industrial leaders, as usual, Walter P. Reuther says the trouble with the people that own American industry is that they have no faith in the future of America. This is his explanation of the shortages that still beset all of us.

It would be too bad for brother Reuther's subjects if a whole lot of us should get that idea too.

• UNCLE SAM must buy his relief food for Occupation Areas at a minimum cost per calorie. Typically the Army buys wheat at about 25,000 calories per dollar, even at present high prices. At that level, Occupation Area food costs during the next fiscal year will be $1,333,-333,333. Only 6,000 to 8,000 calories are available in most other alternate food purchases. Dried eggs, dried skim milk, surplus grapefruit, raisins and prunes, and other available materials would be very welcome if they did not cost three to four times as much per calorie. The Army certainly is not going to ask American taxpayers to spend $5,-000,000,000 or $6,000,000,000 per year just to get this diversity of diet by using other food surpluses. If they tried, we doubt whether Congress or the taxpayers would stand for it.

• FOOD PROCESSORS have 12 million more domestic customers than they had prewar, and it is estimated that there will be still another 12 million population increase in the next 10 to 15 years. Add to this a foreign market that will increase as industrialization abroad raises consumer incomes and you can feel quite complacent. You can, that is, if you are keeping up with, or ahead of, your competitors in process and plant improvements which cut your costs and protect your profits.

• WHEN the cost of raw materials goes down the food processor would normally be expected to derive a slight benefit from it. But, during the February grain price declines, speculators seemed to believe just the opposite. They dumped the shares of the very companies that would benefit most. Which goes to show that emotions rather than logic often rule the behavior of the exchanges.

• SOME things are very difficult to explain. For instance, not long ago we purchased an angel food cake in a New England town. The label contained this interesting information:

"Angel Food Cake . . . 59 cents . . . Net Weight 14 oz.

Texas Bakers, 3401 Fredericksbrugh Road, San Antonio, Texas."

It must be that angels really can fly, else how could a 14-oz. cake justifiably make such a long trip in the channels of distribution?

Hors d'Oeuvres

• *"If you hesitate to eat food combinations such as sauerkraut and cream puffs, pickles and milk," says a publicity release, "quit worrying. You can enjoy them to your heart's content." Who's "you"?*

• Eggs are said to have been dropped onto a special U. S. Rubber Co. mat, from an 11 story building, without breaking. So a Pennsylvania farmer tried putting a mat under an apple tree. Said it proved a partial solution to his bruised apple problem. Looks like apples bruise easier than eggs break.

• *One of these days, according to Farm Journal, your sausage may come wrapped in orange peel—but, they add, "you'll never know it." Bet if the citrus people can help it, you'll know it.*

• Pathfinder says: "Margarine producers see another banner year with more housewives switching from high-priced butter. But butter men say they can sell, at current prices, all they can produce. There's plenty of room for increased use of both . . ." Who wants a firm grip on a hot potato, anyway.

• *Shredded paper impregnated with white mineral oil and sprinkled through a barrel of apples has been found almost as good a preservative as individual wrapping in impregnated tissue. But you can't get around it, it's still mineral oil.*

• Know where substandard and other unpalatable coffee beans are now going? "Coffette Shampoo" is the answer. No well promoted restaurant should let its waitresses be without.

• *In discussing the cost of maintaining a rooster—$5 per year—Farm Journal points out that he won't lay any eggs and the hens won't lay any more of them just because he's around. Unless you breed him, they say, an alarm clock is cheaper. Seems like a way should be found to explain all of this to the rooster, though he might know some of it already.*

J. J.

Free Nations and ERP

The basic aims underlying this country's assistance to the Western European nations appear to justify the economic and political risks involved.

TWO impressions invariably follow any discussion of the Marshall Plan, or as it is coming to be known, The European Recovery Plan. First, there is general accord, in principle, with the aims of the Plan. And then, just as generally, there arises almost complete confusion on the Plan's economic and political aspects. Some of this confusion has resulted, no doubt, from efforts to explain these two aspects separately. Both the economic and political impacts on all the countries involved—and even on those not involved—must be considered together before a true evaluation of the plan can be attempted.

To begin with, ERP evolves from the recognition that Russia, and its Communist cohorts throughout the world, want no part of any real world recovery. Lenin's old principle that "chaos creates an eminently revolutionary situation" has not been forgotten. And certainly a great deal of chaos — economic, social and political—had to follow the most devastating of all wars.

The Communist hold on Eastern Europe, through infiltration plus the threat implied in a large standing army strategically deployed, is too strong to be dealt with by any so-called cold war methods. But the Red infiltration of Western Europe, working without the immediate threat of force, is not yet strong enough to overcome the people's deep rooted hope for recovery while remaining politically free.

Effort Opposed

When the proposal was made that the U.S. might lend a sympathetic ear to recovery plans that would embrace the maximum possible European effort with the minimum U.S. assistance, Russia lost no time in setting up the opposition. And the Eastern European nations had the choice of joining the opposition, or else. But the 16 nations of Western Europe, under the leadership of Great Britain and France, got to work and prepared a plan, which after parings and adjustments has become the European Recovery Plan. It calls for roughly 95 percent home effort and 5 percent U.S. assistance. But that 5 percent assistance is recognized as the decisive factor in tipping the scales toward recovery of these nations under a free political system.

Only Goods

The form of the aid, as should be well known at this juncture, is to be in goods—and goods only. The U.S. government buys the raw materials and finished products from U.S. industry and ships them to the European governments taking part in the plan. These governments, in turn, allocate the goods to the industries within their own borders. When these industries get into production, they will pay their governments for the equipment and materials received. Those governments will then repay the U.S. government. About half the total cost of ERP is expected to be repaid in this way. The other half will be considered a U.S. contribution to, or investment in, our best customers' economic recovery. The total cost may run to $20,000,000,000 over a period of four to six years. The $10,000,000,000 paid by this nation about equals the U.S. share of running World War II for about one month.

Contrary to a rather widespread opinion, the drain on U.S. resources and production will not be very great. In a few instances, notably farm machinery, fertilizer and some seeds, there will be a tight squeeze because of urgent requirements on both sides of the Atlantic. But in general, exports will be under those of the past year, when the Interim Aid Plan was in force, and of course far below those made under UNRRA or Lend-Lease.

Food remains the most important commodity and grain shipments the most important food item. But even here, the strain will be easier than during 1947, unless, of course, the wheat crop is considerably below normal. These lowered exports, however, do not mean a return to prewar's adequate supplies. The grain-using industries, particularly brewing and distilling, may expect another difficult year, even with a normal crop. And spot shortages of wheat may occur in the milling and baking industries due to the maladjustments in distribution. All the wheat we can possibly ship is urgently needed overseas, and in this case an occasional risk appears justified. But in the overall picture, the effect of ERP on the food industry will be good. The inevitable food price decline will be less severe because of the Plan, and it will be strung out over a longer period.

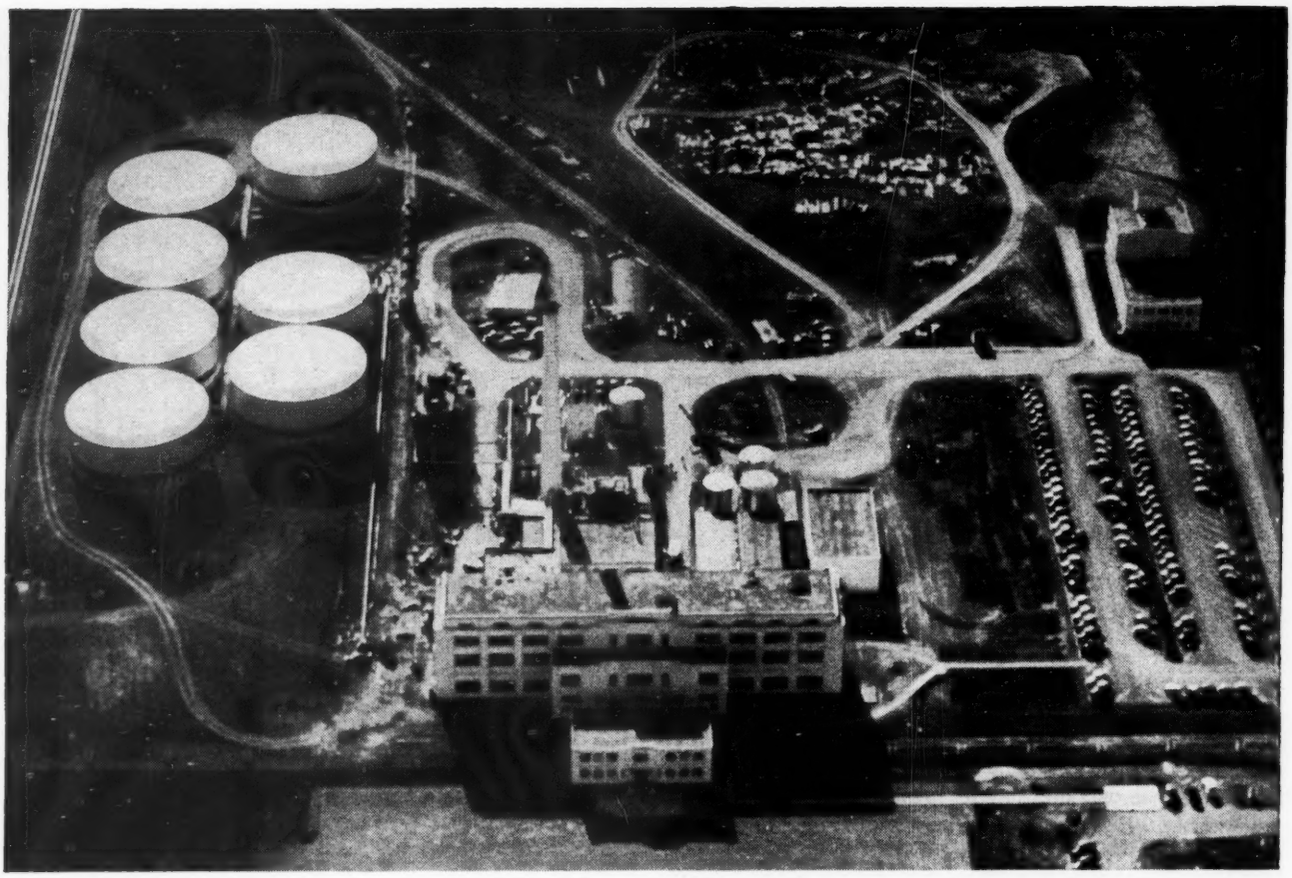
Problem of Administration

In addition to purchases from U.S. industry, ERP calls for U.S. government buying outside the country for Europe. These imports will come chiefly from Latin America. There will also be imports from Europe. All of these imports will yield dollars with which to buy more goods from U.S. industries, in addition to those bought under the Plan. It is obvious that the myriad detail that such a plan entails requires the administration of a firmly established government agency, manned by top-flight personnel.

While there is no guarantee that the plan will work out as hoped, the events of the past six weeks in Czechoslovakia and Finland indicate an urgency on the part of Russia to consolidate all its forces before ERP gets into operation. They know that the Plan's success in Western Europe is bound to stiffen the opposition in the nations coming into its own orbit.

And finally, the cost to the American tax payer is largely a matter of allocation. If Western Europe is permitted to collapse, the extensive defense measures that would be immediately necessary here would require a far greater expenditure and a more serious disruption of the U.S. economy.

This is the first report in a projected series, to be presented by FOOD INDUSTRIES, on the Plan to help Western Europe in its effort to return to economic and political stability. This report is limited to the broad aspects of the Plan. In the future, however, the Plan's impact on the various branches of the food industry will be considered—The Editors



NEW $3,000,000 plant near San Jose, California, makes glutamate from Steffens filtrate supplied by beet sugar factories.

"M. S. G.", Savoring Agent, Made In Special Chemical Plant

New California unit utilizes 100 tons of beet sugar byproduct daily for making monosodium glutamate, flavor accentuator for food products

By PAUL D. MANNING, Vice-President in Charge of Research
International Minerals and Chemical Corporation, Chicago

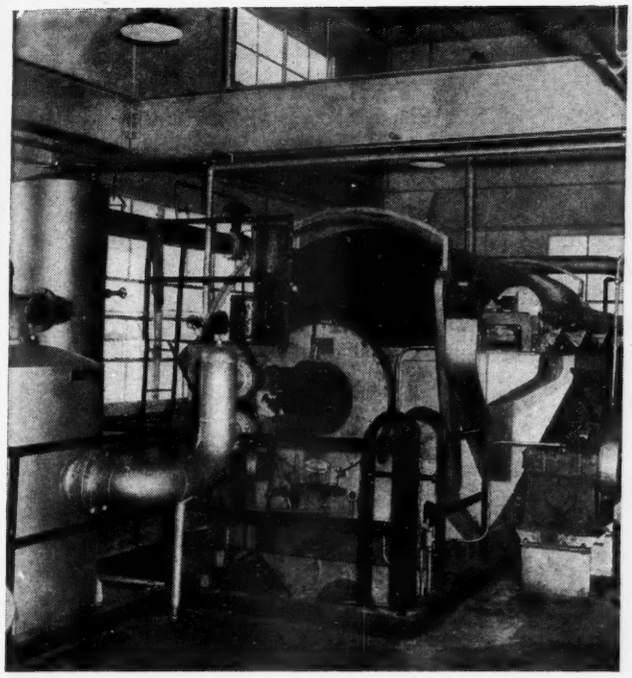
MADE in an impure form and used in the Orient for many decades, monosodium glutamate was first placed in commercial production in the United States at the instigation of one of the country's large food processors. It is now being made by three manufacturers who operate four factories. A fourth producer is soon to begin operations.

Three different raw materials are in present use: wheat gluten, corn gluten and Steffens filtrate resulting from the desugaring of beet sugar molasses.

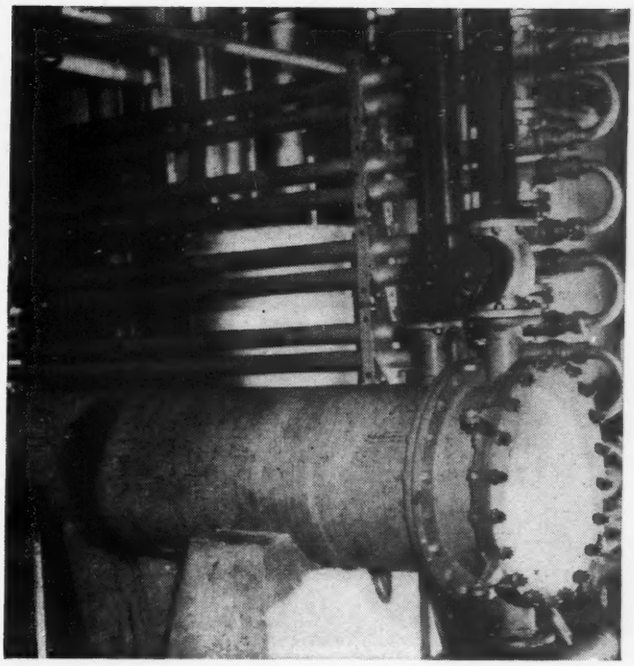
International Minerals & Chemical Corporation is operating two plants, one at Rossford, Ohio, which uses wheat gluten and corn gluten, and a new $3,000,000 factory just south of San Jose, California, where concentrated Steffens filtrate from a number of beet sugar factories is used as a raw material.

Because of the difficulty of separating glutamic acid from other substances and because of the complexity of the processes involved, it is at present not economically feasible to use as raw materials, substances in which this amino acid is present in relatively low concentrations. Even corn gluten is a questionable raw material from this standpoint unless markets are available for the large amounts of byproducts.

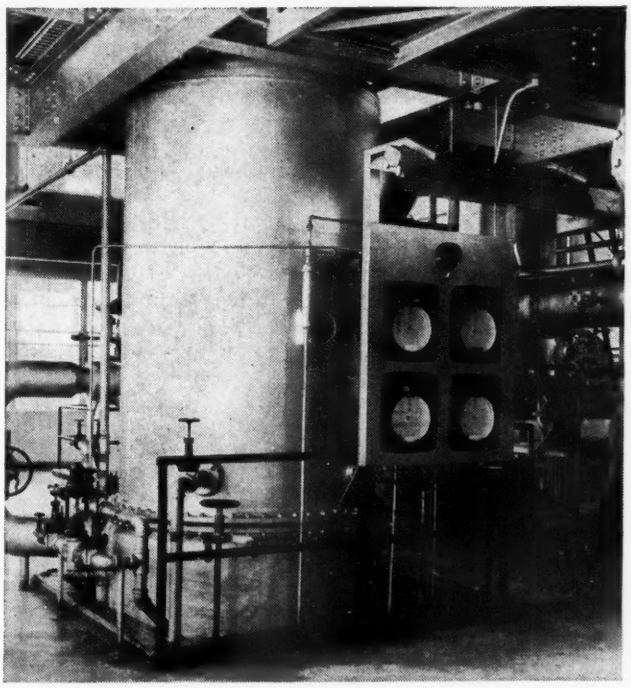
Production of glutamic acid from



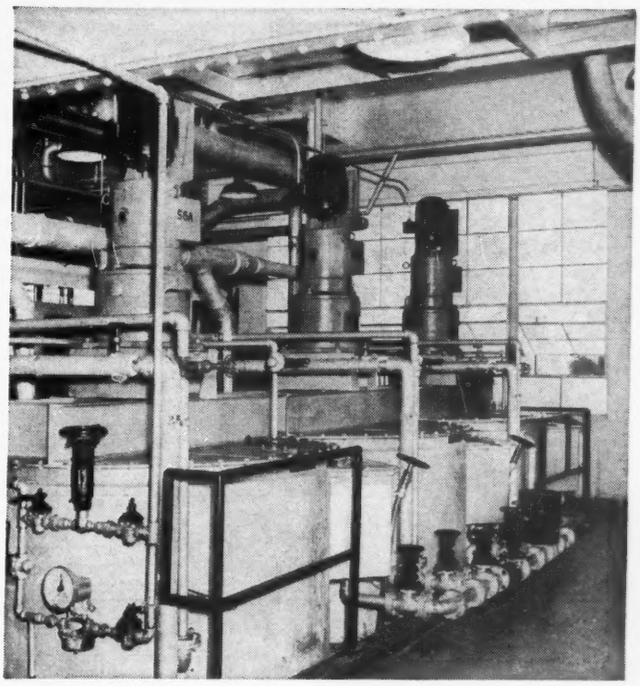
1. FIRST operation after weighing is to pass concentrated Steffens filtrate through an Oliver precoat filter.



2. FILTRATE passes through Karbate heat exchanger on its way to evaporator. Corrosion problems are severe.



3. CONCENTRATION of filtrate is adjusted by evaporation in a single effect calandria evaporator, shown here.



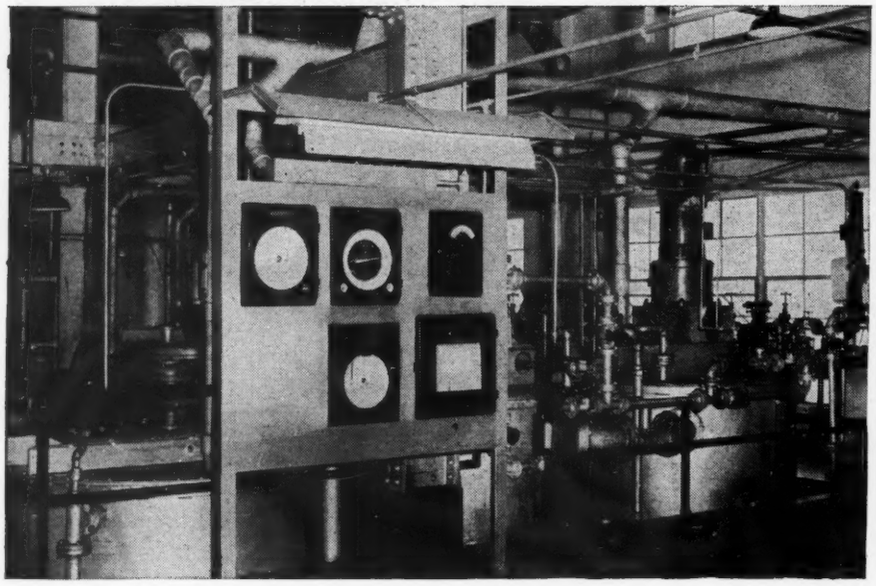
4. HYDROLYZERS are steel tanks where filtrate is mixed with caustic soda. Hydrolysis is carefully controlled.

the Steffens solution was originally carried out successfully in the United States through a process developed by Dr. A. E. Marshall and his associates for James E. Larrowe. This was done at Rossford, Ohio, the organization being known as the Amino Products Company. In 1942, International Minerals & Chemical Corporation purchased the business. Within a year, the plant was converted for a different process using wheat gluten as raw material. Because of the demand for beet sugar molasses and the decreased production of beet sugar in the central area, the beet sugar producers practically ceased operation of the Steffens process and wheat gluten became a more advantageous raw material at this location. At the same time plans were made for a new plant in California where the beet sugar industry was increasing and where a larger supply of Steffens filtrate was avail-

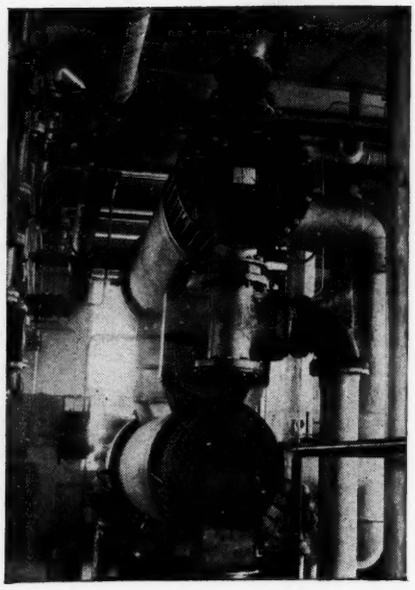
FLAVOR ACCENTUATOR

As a savoring agent, monosodium glutamate has some very interesting properties. When pure, it has no flavor. It does have a salty, somewhat sweet taste. But it has the power of flavor accentuation when used with most foods. Delicate flavors of fine foods, partially lost or destroyed in standing after cooking or in processing, are restored or accentuated by this seasoning.—The Editors.

Hydrochloric Acid Neutralization Follows the Hydrolysis



5. **NEUTRALIZATION** takes place here. Instruments on panel board are automatic pH controls. Neutralization with HCl forms glutamic acid in the solution.



6. **NEUTRAL** solution goes through Karbate heaters. (Dismantled).

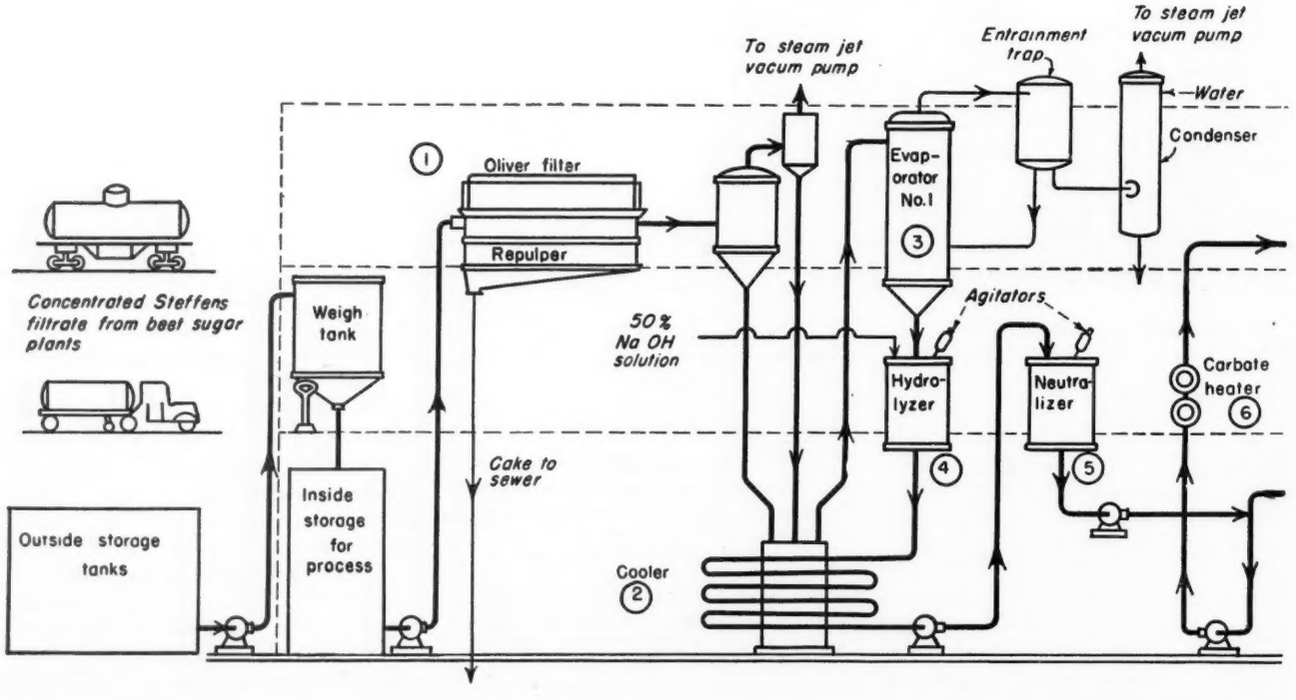
able and being wasted. This plant was completed in the late spring of 1947 and is operating satisfactorily, utilizing 100 tons of concentrated Steffens filtrate per day.

In Three Forms

Glutamic acid exists in three forms, due to the fact that it contains an asymmetric carbon atom. They are the $L(+)$ or "active" (natural) form, the $D(-)$ or "inactive" form, and the racemic mixture of the two modifications. The active form is the one occurring naturally. It is the monosodium salt of this form which has the power of flavor accentuation when added to foods. Although it is possible to produce glutamic acid synthetically, the racemic mixture always results. Similarly, the racemic mixture is produced by the hydrolysis of proteins with an alkali. Resolution of the racemic mixture is a very expensive process not commercially feasible at the present time.

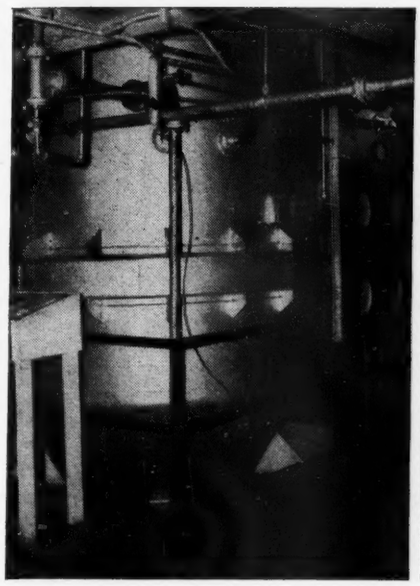
Present as Glutamine

Glutamic acid is present in the sugar beet in the form of glutamine. During the processing of the beet sugar juice, the glutamine is changed to the internal anhydride, pyrrolidone carboxylic acid which remains in the molasses. In desugaring the molasses by the Steffens process, it is first diluted to about 5 to 6 percent sugar, then contacted

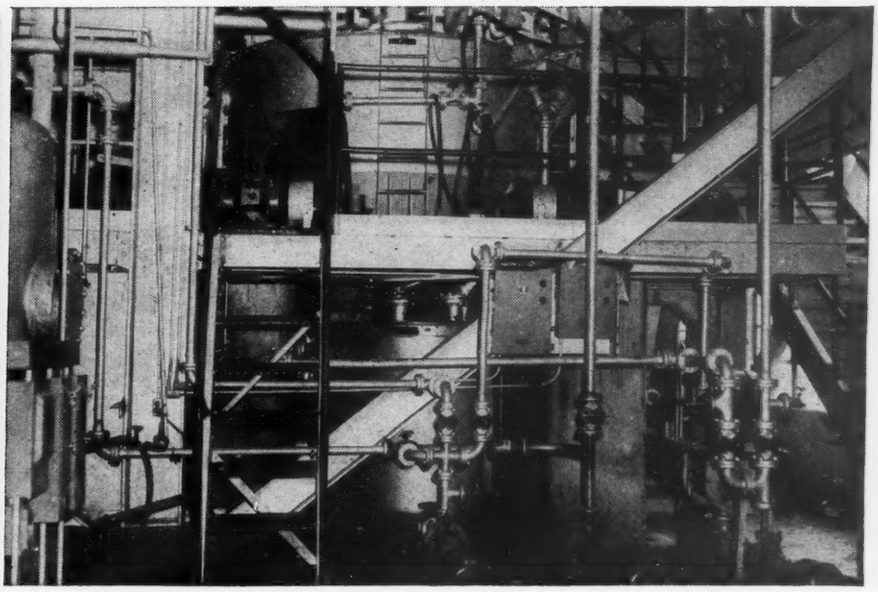


FLOWSHEET above shows treating Steffens filtrate for liberation of glutamic acid. Pictures show equipment with key numbers.

Mineral Salts are Removed Before Glutamic Acid Separates



7. ACIDIFIED hydrolysate is concentrated in evaporator (above).

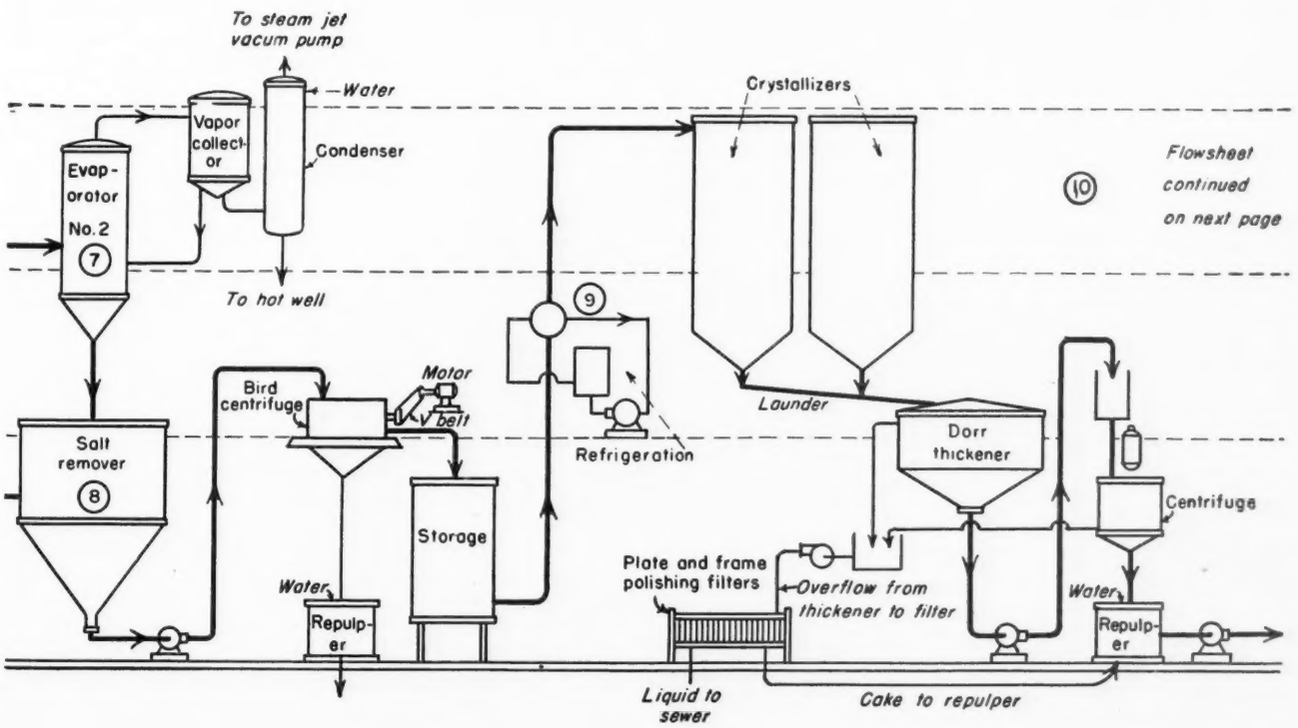


8. MINERAL salts are removed at Bird continuous centrifugal station. Then the pH is adjusted to the isoelectric point of glutamic acid.

with freshly burned lime which has been freshly ground. The fresher the lime surfaces and the finer the grinding, the more complete is the sugar removal. With the addition of lime, calcium saccharate is formed. This is insoluble, and it is removed by filtration, then returned to the sugar process. The resulting solution contains about 2½ percent dry substance. It has generally been wasted in the past.

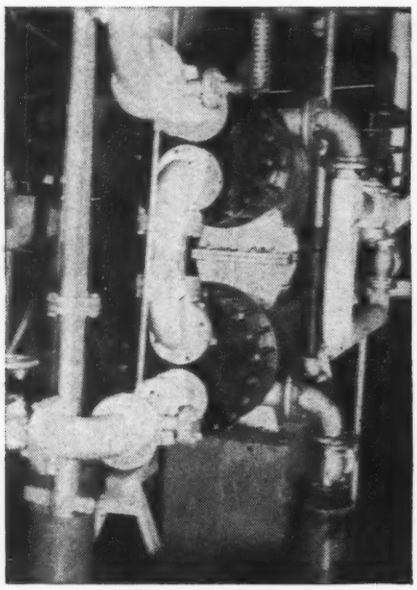
By long term cooperative contracts with sugar producers, International has installed large multiple effect evaporators in the sugar plants for concentration of the Steffens filtrate. First it is carbonated with lime kiln gases. Then the precipitated calcium carbonate is removed and the filtrate is concentrated to about 65 percent solids, after which it is run into storage tanks. It is then transported by tank truck or tank car to the San Jose plant, where it is stored in seven 1,500,000-gal. tanks. Here the concentrates from various sources are blended to make a raw material of fairly uniform quality.

From the storage tanks, the concentrate (which has the appearance of molasses) is passed to a weighing tank, then to an Oliver precoat filter. The suspended solids are washed to the sewer. If required, the concentration is adjusted by a preliminary evaporation in a single effect calandria evaporator. The

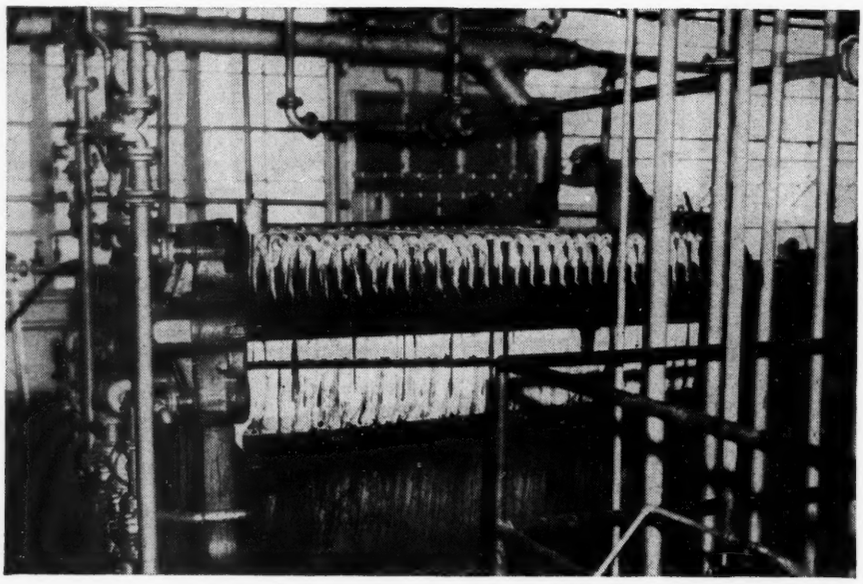


FURTHER operations, above, result in separation of crude glutamic acid, ready for treatment at the purification station.

Chilling of the Mother Liquor Assists the Crystallization



9. REFRIGERATED Karbate coolers used for chilling mother liquor.



10. CRYSTALLIZATION takes place in rubber lined crystallizer. Thickeners, centrifugals, plate and frame filter presses (above) are then used.

liquid is then run into steel hydrolyzing tanks along with a 50 percent solution of caustic soda. Its temperature is carefully controlled as are the pH and time in the hydrolyzers. In this step, the pyrrolidine carboxylic acid is hydrolyzed to glutamic acid.

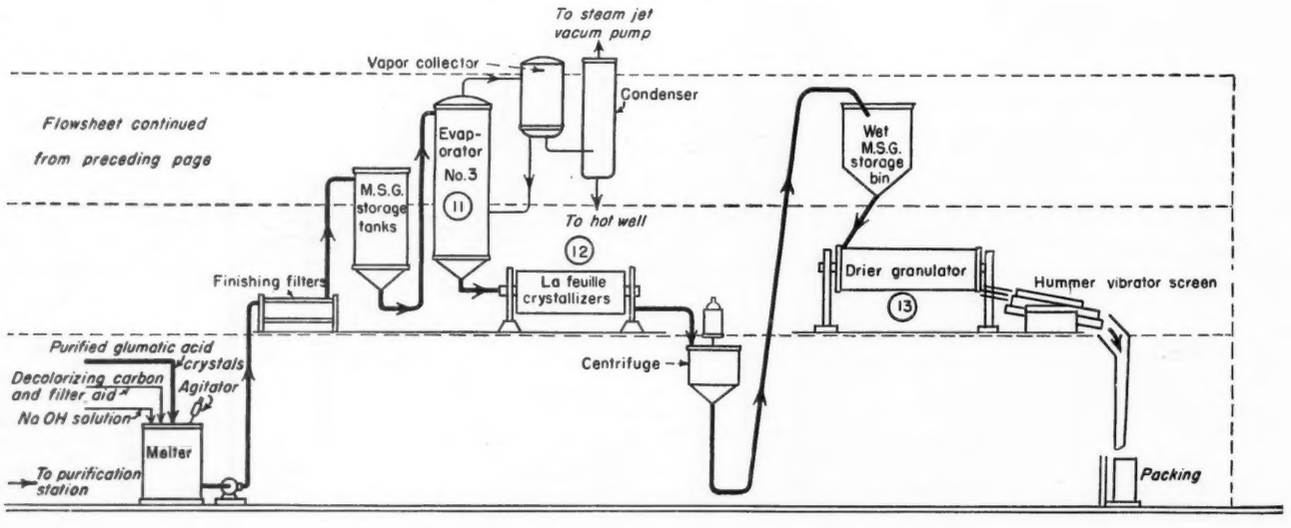
Separating the Crystals

After cooling, the hydrolysate is acidified with hydrochloric acid and concentrated by means of a forced circulation evaporator. Then the mineral salts are removed by a Bird continuous centrifugal. The pH of filtered solution is carefully adjusted to the isoelectric point of glutamic acid. At this stage, the liquor is chilled by refrigeration and passed into large rubber-lined crystallizers. The time required for crystallizing is approximately 5 to 6 days. During this time the glutamic acid crystals form along with sodium chloride and other solids.

Discharged from the crystallizer, the slurry enters a Dorr thickener. The underflow is passed through a battery of Western States centrifugals, the overflow being passed through plate and frame polishing filter presses along with the filtrate from the centrifugals. The filtrate is then weighed and goes to by-product operations.

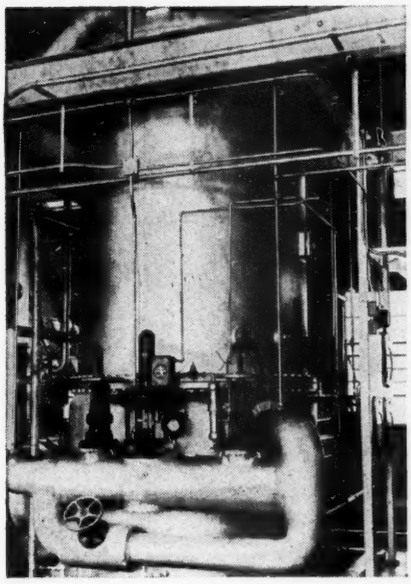
After leaving the centrifugals, the crude glutamic acid is refined. The refined material is made into a solution of monosodium glutamate with caustic soda and is then concentrated in a single effect boiling pan to the proper density. The solution goes to the LaFeuille crystallizers, where the crystallizing cycle is automatically controlled.

When the cycle is completed, the slurry is discharged from the crystallizers, centrifuged and dried by hot air in a rotary drum dryer. The product is then screened to produce the several sizes desired and it is packaged in fiber containers each holding 200 pounds.

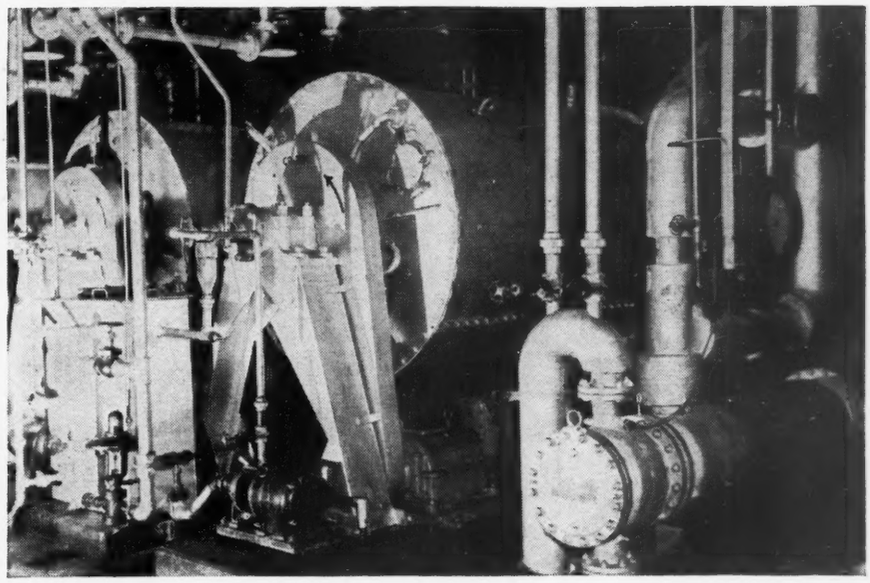


FINISHING operations are shown on this part of flow diagram. Glutamic acid is purified, converted to monosodium glutamate.

Monosodium Glutamate Process is Completed in These Units



11. PURE glutamate is concentrated in single effect evaporator.



12. GLUTAMATE crystals are forced in LaFeuille crystallizer where the crystallizing cycle is automatically controlled. Slurry is centrifuged.

Complex Operation

Briefly described, the process appears quite simple, but in actual operation, it is quite complex. In the San Jose plant there are nearly 1,500 valves. Corrosion problems are severe. Hydrochloric and glutamic acids are very corrosive and the mixture of the two is extremely so. Only one type of stainless steel has been found even reasonably satisfactory. Rubber lined equipment when properly made has given fair service, but it appears that fabricators of such equipment have something to learn as to the application of rubber to certain kinds of process equipment.

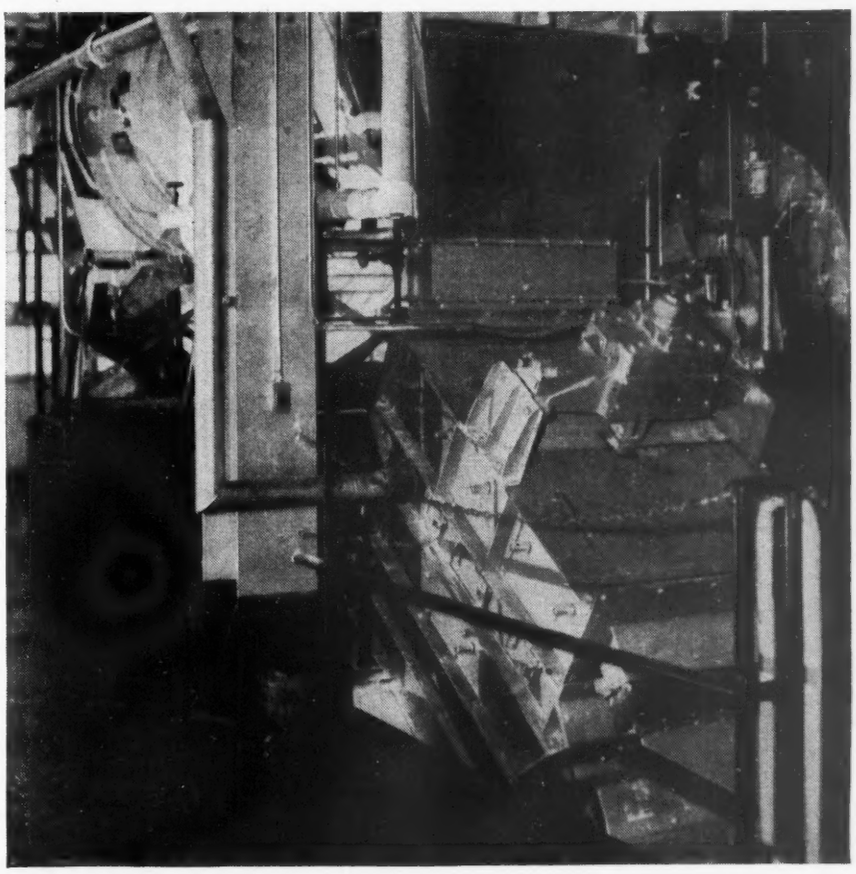
May Racemize

Glutamic acid of the $L(+)$ form tends to change to the racemic mixture under certain conditions, not all of which are known at the present time. In solution, also, it reconverts under certain conditions to pyrrolidone carboxylic acid. Since the usefulness of the product depends upon its high purity, the process requires exceedingly careful chemical control. In spite of all the work carried out in many laboratories throughout the country, there is as yet no quick and accurate method for the determination of glutamic acid in any material. It is therefore necessary to use several different methods in control.

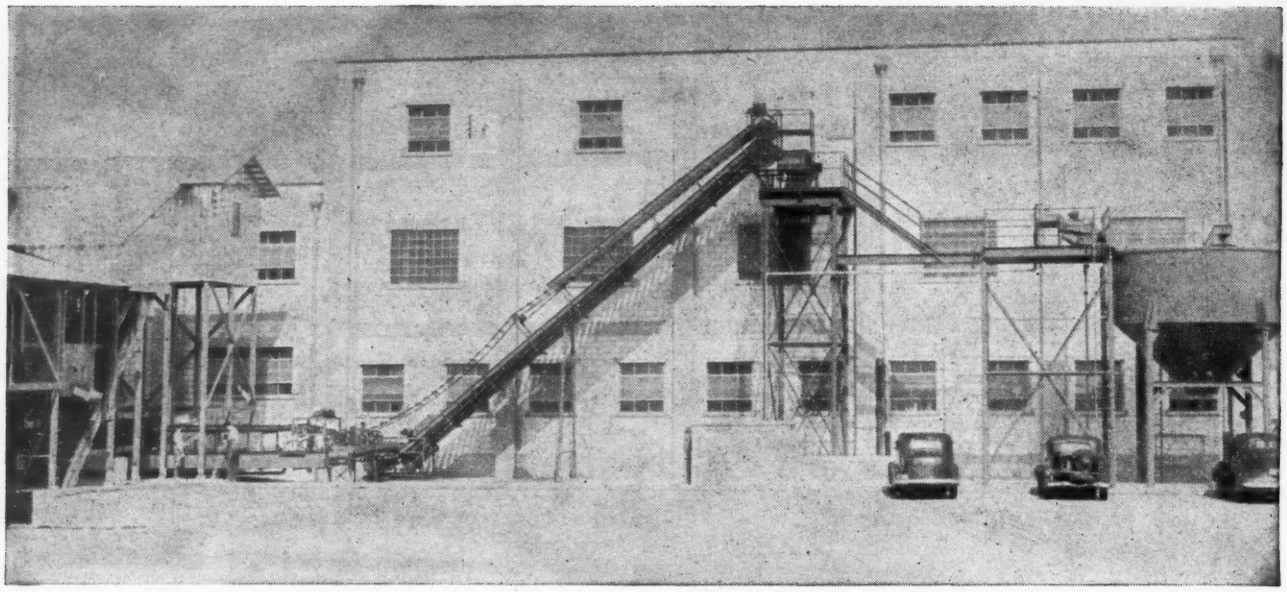
Because of the complexity of the process, the opportunities for losses are numerous and these, of course, have immediate effect on yields and production costs.

In the San Jose plant, automatic controls are used throughout the entire operation wherever possible. Work is constantly underway in the plant and in the development laboratory in an effort to improve processes. Operation of the plant is on a "round the clock" basis.

Variations in raw materials usually require some pilot plant work to determine the best full scale operating conditions. When conditions are properly maintained, however, the process is a beautiful example of what precise chemical engineering can do in the food industry.



13. FINAL process steps take crystals through rotary drier and hummer screen, seen here. Screened product is packaged in 200-lb. fiber containers.



1. FROZEN CONCENTRATE PLANT of Florida Citrus Canners Cooperative, Lake Wales, Fla. Left to right: Fruit receiving bin; fruit washer of brush and spray type; conveyor for elevating fruit to extractor room; waste peel and pulp bin.

Improved Citrus Concentrate Depends on Advanced Technique

Juice from selected fruit is concentrated at a low temperature in new vacuum evaporator utilizing ingenious ammonia heat exchange. Concentrate is quick-frozen, vacuum packed in sealed cans and stored at —10 deg. F.

By J. L. HEID and C. G. BEISEL, Director and Assistant Director of Research and Development, Florida Citrus Canners Cooperative, Lake Wales, Florida

IN February 1948 the Florida Citrus Canners Cooperative, Lake Wales, Fla., completed a new and revolutionary plant. The plant was designed and built solely for preserving the juice of carefully selected citrus fruits without modification of flavor or food value. This is accomplished by concentrating the juice quickly in an extremely high vacuum, followed by quick-freezing and storage in sealed cans under vacuum at a low temperature.

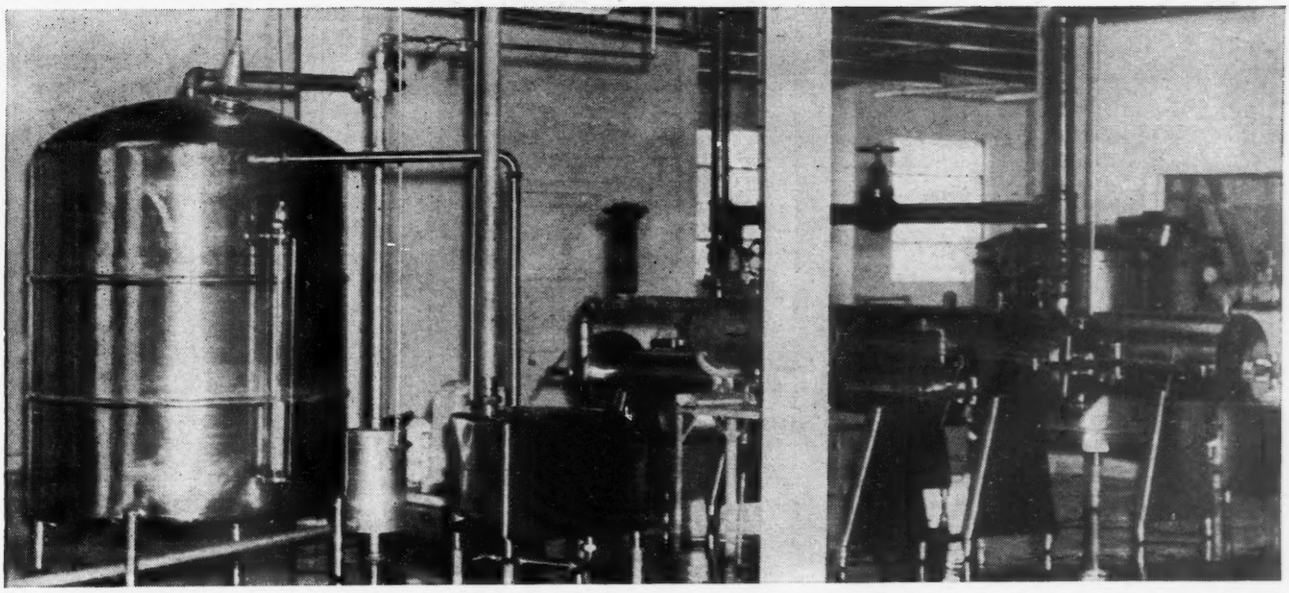
The engineering development involved is a unique heat exchange system in which compressed ammonia vapor furnishes the heat of vaporization. Water vapor from the juice is condensed on the refrigeration side of the cycle. This reduces the pressure in the evaporator to the point where concentration of juice takes place at 50 to 70 deg. F.

Technical Progress

The origin of canned citrus juices dates back to 1929 when the Cooperative's director of research and development, J. L. Heid, joined the staff of the U. S. Fruit and Vegetable Chemistry Laboratory at Los Angeles. It was observed that flash heating in high velocity tubular heaters permitted the canning of citrus juice with better flavor than could be obtained using kettle heaters. Although flash pasteurization modifies the flavor of citrus juice as it modifies the flavor of milk, some individuals preferred the taste of the pasteurized product.

As flash pasteurization gradually came into commercial use it was evident that extension of the shelf life of canned juices was the next problem for the canning technologist. Canned juice deteriorated rapidly when storage temperatures exceeded 85 deg. F. Deterioration slowed almost to a standstill at 30 deg. F. Improvements in canning methods have since extended the storage life under adverse storage conditions. By rapid handling under sanitary conditions, out of contact with injurious metals and alloys, loss of Vitamin C can be reduced to an insignificant amount. Juice can be packed which will have an excellent flavor after 18 months under ordinary storage conditions.

While this commercial development was under way, work was

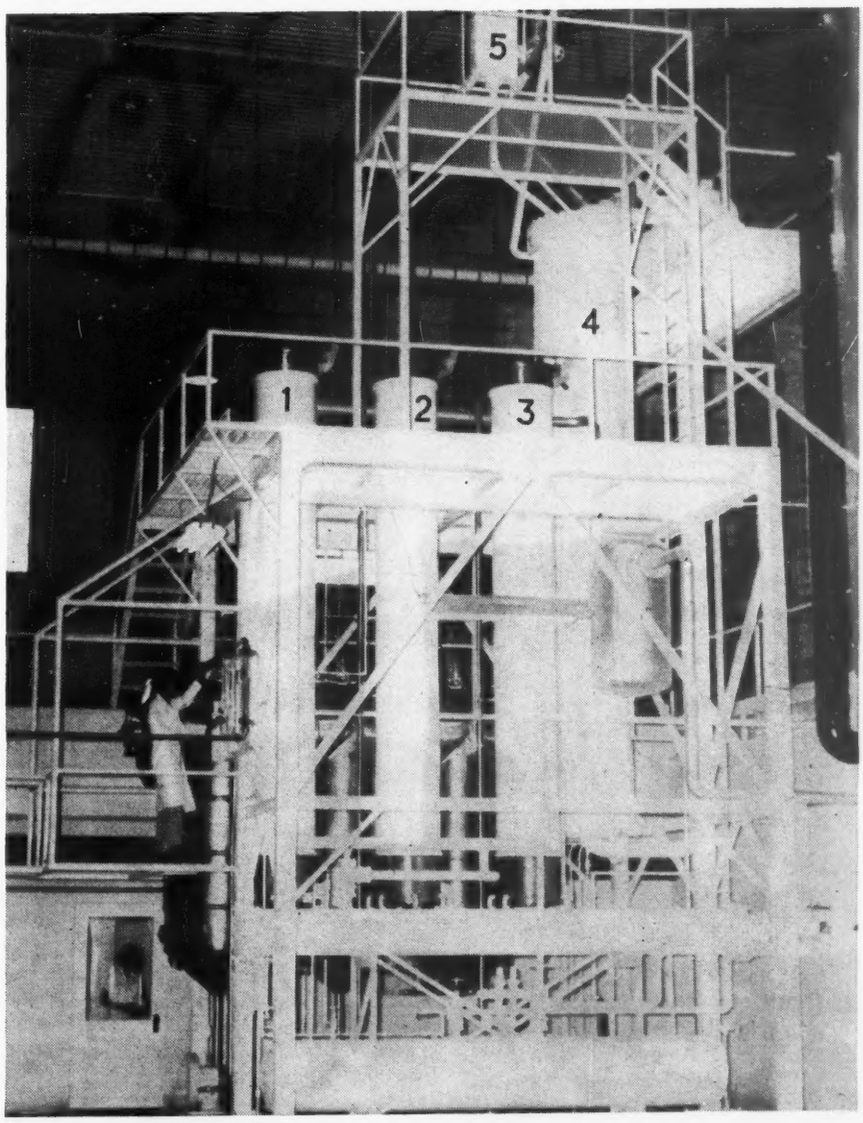


2. JUICE HANDLING EQUIPMENT. Left to right: Deaerator tank with balance tank; flash tubular heater and water jacketed cooler (for special products); ammonia jacketed coolers (used for all juice). Right rear: Balance feed tank for evaporator.

continued on the problem of delivering citrus juice with the flavor unchanged from that of juice freshly squeezed from selected fruit.

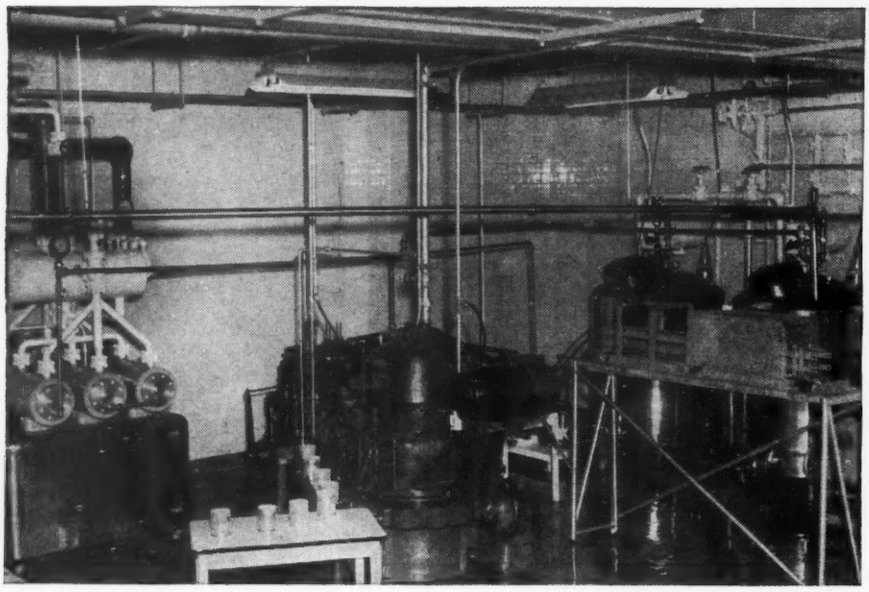
In tests at the Los Angeles Laboratory, juice which was handled promptly, thoroughly deaerated, hermetically sealed in gas-tight containers and quick-frozen by immersion in alcohol at —90 deg. F. was held for several years at 0 deg. F. without perceptible deterioration in flavor. But container, shipping and storage costs were high and facilities for handling the juice at 0 deg. F. were not generally available. In some early commercial ventures, paper packages were used and the product deteriorated rapidly due to dehydration and oxidation. Consumers found that special precautions were necessary to avoid damaging flavor and texture during defrosting.

During the past 15 years, however, equipment for concentrating citrus juice has been improved. Time of retention in the evaporator has been shortened and multiple stages have been introduced. Operating temperatures and pressures have been lowered. Agitation has been increased to minimize local overheating. Resulting improvement in products indicated that, if operating temperatures, pressure and time of retention could be reduced sufficiently, it would be possible to concentrate citrus juice without appreciable modification of the taste. The temperature of available condensing water imposed a limitation on reduction of operating temperatures unless resort was had to pumping uncondensed va-

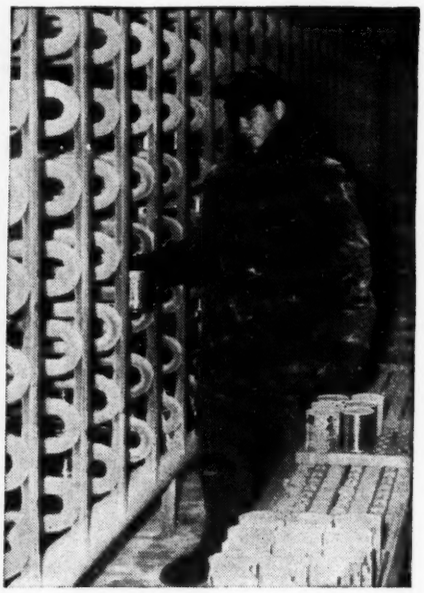


3. VACUUM EVAPORATOR (Columns 1, 2, 3) uses ammonia vapor at 105 deg. F. to suppy heat to citrus juice. Fresh juice enters column at left and is removed continuously at right with 60 percent solids. Water vapor is condensed in ammonia jacketed condenser (4). Evactor (5) removes noncondensibles from system.

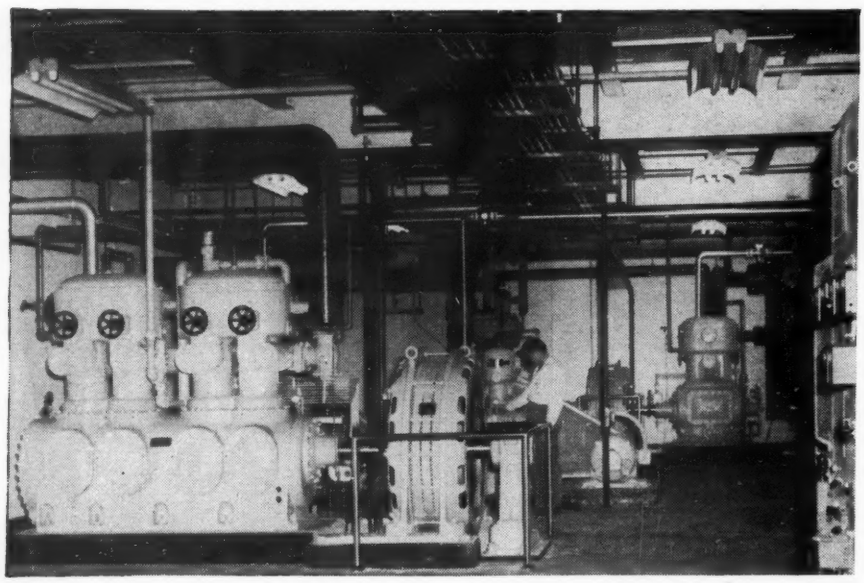
Upon Leaving Evaporator Juice is Standardized and Quick-Frozen



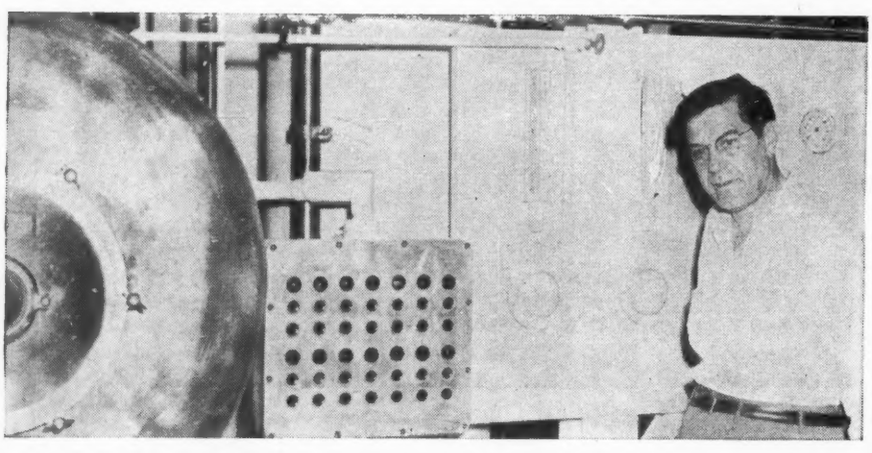
4. CONCENTRATED JUICE is standardized to 42 percent solids with pulpy juice and chilled in ammonia jacketed vacuum tanks (right). It is slush frozen in Votator (left) and filled into cans. Cans are vacuum sealed on closing machine (center).



5. FILLED cans are transferred to hardening coils in −10 deg. F. room where concentrate is hard frozen.



6. COMPRESSOR replaces boiler and cooling water in evaporation operation. Additional compressors (rear) refrigerate tanks, Votator, hardening room.



7 J. C. Cross, Mojonnier Bros. Co. engineer, at control panel of "Low-Temp" evaporator. Separator (shown at left) removes water vapor from evaporator units.

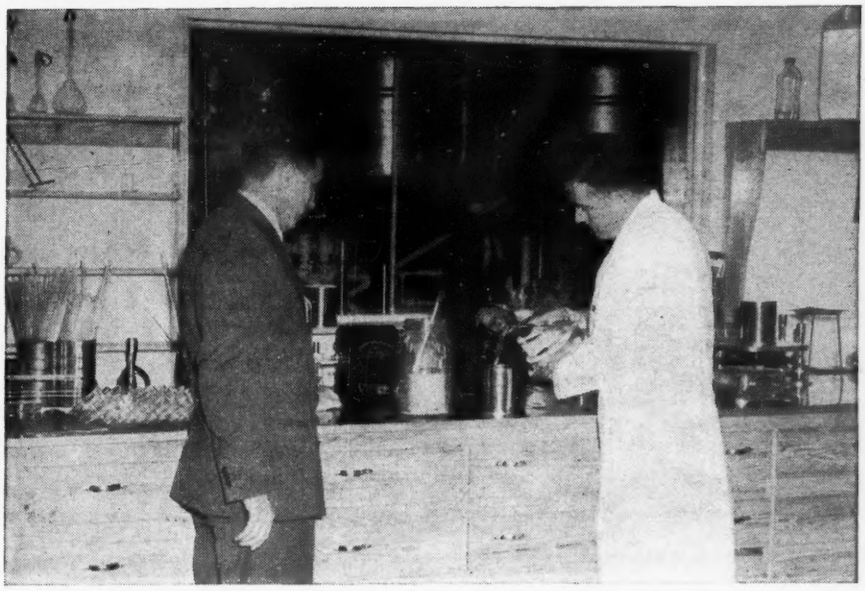
pors, or using unrefrigerated condensers.

Using equipment and methods planned by L. G. MacDowell, director of research, Florida Citrus Commission, and J. L. Heid, then director of the U.S.D.A. Citrus Product Station, Winter Haven, Fla., MacDowell, Moore and Atkins concentrated juice at low pressures without modifying the taste. The flavor of the concentrate was flat, however, due to loss of volatile constituents. The addition of orange oil, as is done with conventional concentrate, improved the flavor. But these investigators developed a process for concentrating the juice to 60 percent solids, then adding sufficient unconcentrated juice to reduce the solids to 42 percent. This produced a concentrate which when reconstituted after freezing, could not be distinguished by most tasters from freshly squeezed juice.

With this promise of commercial possibilities, the Cooperative called on Mojonnier Bros. Co. in 1944 to supply equipment to permit commercial application. Mojonnier had supplied de-oiling deaerators based upon preliminary designs developed by the Cooperative.

The objective and the obstacles were discussed with Mojonnier's engineer, J. A. Cross. As the temperature of cooling water was 80 deg. F., it would be necessary to compress all vapors through a booster before condensing, or condense the vapors in a refrigerated condenser ahead of the evactors.

Frozen Concentrate is Reconstituted by Adding Three Cans of Water



8. RECONSTITUTION. The authors demonstrate recommended procedure for making one gallon of juice from a quart can of frozen concentrate using gallon mayonnaise jar. Quart and gallon cans are sold to the institutional trade.

9. RETAIL PACKAGE that makes 1½ pints of pure citrus juice when reconstituted by adding water.

After considering the problem, Cross suggested using both sides of a refrigerant compressor system. Water would be evaporated from the juice in one tubular heat exchanger with heat given up by condensing compressed ammonia. Vapors would be condensed in a second tubular heat exchanger by evaporating the liquid ammonia through an expansion valve. This would give an approximately balanced system of high efficiency.

Mojonnier Bros. Co. agreed to build pilot equipment and the Cooperative agreed to furnish facilities and assistance for testing the process. The pilot tests, conducted in the spring of 1945, were entirely satisfactory and a commercial plant was designed. The low temperature of the compressed ammonia (105 deg. F.), eliminated hazards of local overheating and permitted the adoption of falling film operation for the evaporator. Basic claims of patent applications have been approved. The Cooperative has received royalty concessions and a period of exclusive operation on citrus juices in consideration of its contribution to the development and demonstration of the process.

How The Process Operates

Fruit of selected varieties, picked at its best, is selected from the groves of owners or is purchased to meet standards of flavor, color, sugar, acid and vitamin content to produce a uniform product. The fruit is sorted, washed to remove dirt and bacteria, resorted and rewashed just before the juice is extracted in improved extractors.

The juice is strained to remove seeds and membranous material, then screened to separate 90 percent of the juice in strained form from ten percent containing the juice sacs (pulp). The 90 percent portion is deaerated under vacuum and introduced into the evaporator, where the soluble solids content is increased to 60 percent within 4 minutes.

The evaporator consists of three vertical cylinders each containing 25 3-in. tubes. Pumps raise the juice to the top of these tubes which are jacketed with the compressed ammonia at 105 deg. F. The bottom of the tubes is connected with a horizontal vapor separator through which the vapor moves to the condenser. The condenser is a vertical tubular heat exchanger with ammonia expanding through the tubes. A two-stage ejector is connected to the top of the condenser to remove uncondensibles.

Lime, lemon, orange or grapefruit juice, entering the first stage at 8 to 13 percent soluble solids, overflows to the second stage in about 1.3 min. at a soluble solids content of 20 percent. It overflows to the third stage in an additional 1.3 min. with a soluble solids content of approximately 40 percent, and is pumped out of the third stage with a soluble solids content of approximately 60 percent. During concentration the temperature of the juice ranges from 50 to 70 deg. F., depending upon the rate of feeding and the vacuum maintained by the evactors.

Laboratory tests check the solids, acid and vitamin content, and the microbiological condition of the juice at every stage from the extractors to the frozen product. Standards have been established to insure optimum quality, palatability and uniformity.

The concentrate, at about 60 deg. Brix, is pumped continuously from the evaporator into insulated, ammonia jacketed, closed tanks, which are maintained under a vacuum. Here the unconcentrated juice, containing the juice sacs, is added in the correct proportion to give a product containing 42 percent soluble solids. The juice is cooled to approximately 25 deg. F. It is then pumped through a Votator and frozen to a creamy consistency at a temperature of 16 deg. F., filled into cans which are sealed under a vacuum, and conveyed to hardening coils in a room at —10 deg. F.

After hardening for 24 hours, the cans are returned to a room at ordinary temperature for casing, and then stored at —10 deg. F. until shipped.

Semi-frozen concentrate from the Votator is filled into 6-oz., 1-qt. and 1-gal. cans. 6-oz. cans are for retail consumers. Upon reconstituting with three cans of water, 24 oz. of juice are secured. To most tasters, the flavor is indistinguishable from that of the juice of fully ripened, freshly squeezed, newly harvested fruit.

COMMITTEE setting standards. Each unit area is assigned a standard by a committee composed of the plant manager, the sanitation consultant and the plant sanitarian.

RATER rating a production area during one of the regular bi-monthly inspections.

How The Food Plant Can Use

PART II—Data provide management with a complete analysis of plant sanitation

By MOHE H. SOLWORTH, Sanitation Consultant, Louisville, Ky.

INFORMATION assembled in the sanitation rating system,* which is accumulated in the plant report, serves the following purposes:

1. It provides management with a complete analysis of the sanitation picture within a plant, showing what factors influence the sanitation level and to what degree.
2. It serves as an accurate basis for management's determination of sanitation costs.
3. It aids in the execution of company policy.
4. It provides a chart of departmental sanitation performance.
5. It helps department heads to control sanitation in departments.
6. It provides the department head with facts and figures to back up his work orders.

Cost Data

Many attempts have already been made to compute specific sanitation costs in various plants. Costs of cleaning windows, floors and walls have actually been computed on a square footage basis. This is the first time, however, that an accurate attempt has been made to measure the quality of cleaning achieved by the expenditure of the sanitation budget.

Where the quality of cleaning enters into the picture, rather surprising results sometimes appear. For example, one of the plants under the rating service dispensed with the services of a private window washing firm, that had been servicing part of its plant, after the second inspection. It was discovered that windows washed by the commercial firm did not meet the sanitation standards set up in the rating program. This same plant had been extremely proud of the fact that it was not spending all its sanitation budget. The first rating showed such low sanitation levels that the extra personnel needed to bring the plant up to its standard were hastily restored. Before the first inspection there had been no measure of the sanitation results which were achieved in this plant.

Many other factors can be considered in interpreting cost data in sanitation. Once management has accurate data, it is able to make decisions on the following questions:

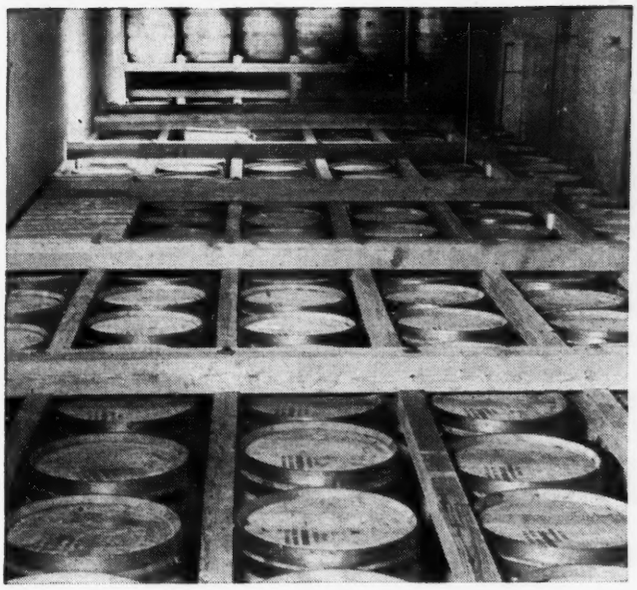
1. What sanitation levels are desirable in terms of the cost necessary to attain those levels?
2. After the plant sanitation level has been attained, is it desirable, from a cost standpoint, to strive for higher levels?
3. How can money best be spent for the maintenance of (a) High sanitation levels, (b) higher type personnel who will be able to operate on a scientific basis, (c) more personnel, or (d) new installations or improvements which will make the maintenance of the desired level possible with less time and effort?

With reliable data on sanitation achievement management can now make these decisions intelligently, knowing exactly what the results of those decisions will be in terms of plant sanitation levels.

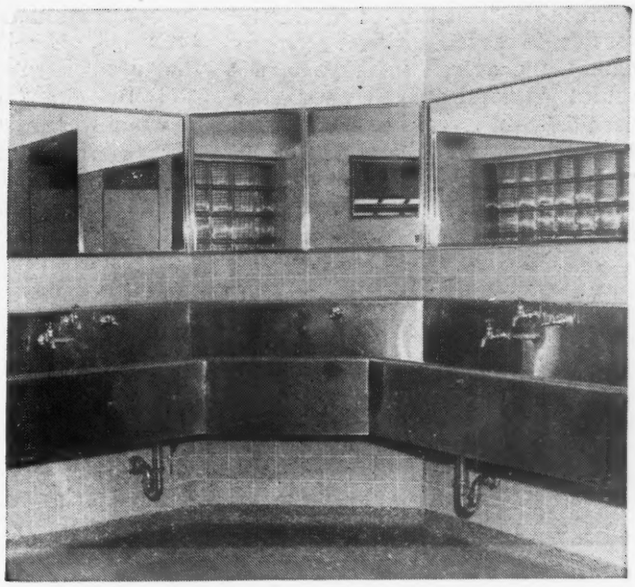
Special Analyses

On the basis of the rating service data it is possible also to make quick surveys of any aspect of sanitation which may be desirable (facilities, condition of painted walls throughout the plant and condition of windows). For example, in plants using this rating service, management is interested in employee facilities. Recently, we made a special study of all employee facilities in all the plants from the data

* Mohe H. Solworth, Quantitative Method Helps Control Plant Sanitation, Food Industries, p. 82, March, 1948.



WAREHOUSE areas require less frequent cleaning than most other areas, but emphasis is given to the maintenance of order.



LAVATORIES are assigned high standards, since the essential function of these areas is impaired if they are uninviting.

A Sanitation Rating System

and give department heads facts and figures to back up their work orders

accumulated by the rating service. This eliminated costly extra surveys, otherwise necessary.

The rating system may be used also as a medium for executing and reflecting company policy. For example, it has long been company policy in the plants with which we are associated to stress the maintenance of pipe lagging. Despite the importance of this lagging, both from the production and from the sanitation standpoint, we have had considerable difficulty in securing sustained interest in its maintenance. Now, however, by allocating a larger part of the score on overhead fixtures to maintenance of insulation lagging, we find it easier to control this factor.

Personnel Analyses

The rating service also provides a chart of departmental sanitation performance which serves as a permanent record of the progress of the department in sanitation. This means that the sanitation level of the department is a reflection on the department head.

This is the first attempt within our company plants to record sanitation measurement. It spurs the department head to more diligent efforts in sanitation to keep his sanitation record up to his records for production and other phases of his duties. In this way the record of the department head in sanitation influences strongly his personnel record and his opportunities for executive rating.

For the department head the rating data is a tool which can be used in many ways to achieve sanitation control in his department. Under the departmental sanitation plan, the department head is directly responsible for the sanitation conditions in all areas under his jurisdiction. Naturally, he delegates the responsibilities for various areas to his respective supervisors. He remains, however, the coordinating agent for the sanitation program in his department.

Probably the most important part of the task of correcting sanitation problems is the delineation of specific responsibility for the existing condition. Problems noted under the "Cleanliness" column of the rating form are usually the responsibility of the sanitation staff. It is, however, the employees working within the area who maintain either an orderly or a disorderly area, as the case may be. Where problems of "Order" occur, it often means employees must be trained in more orderly work habits.

Impartial Rating

The department head, himself, issues the work orders for necessary repairs. The rating data give him the necessary facts and figures with which to back up these work orders. It has been our experience that, in many plants, maintenance work requested for reasons of sanitation is frequently considered to be an unnecessary whim of an overparticular department head. Under this system, the department head has the evidence of an impartial rater to back up his work orders.

The actual details of the corrective program in sanitation originate with the supervisors to whom the department head delegates the responsibility. Each supervisor studies the sheets for the areas within his jurisdiction and sets about to correct the problems outlined therein. The sheets serve also as a basis for planning and scheduling sanitation work.

This discussion of a sanitation rating system, as applied to a food plant, is a companion article to the description of the system itself, which appeared in the March issue of FOOD INDUSTRIES. Under this rating plan, each area of a plant, from production areas to cafeterias, or to warehouses, gets rated on three points: (1) Order; (2) sanitation, and (3) the sanitation "force" assigned to the area. A report is made bi-monthly, and areas are scored on their deviation above or below their established rating.—The Editors.

Since the inception of the rating service in seven of our company plants, the overall increase in the sanitation level for all plants has been 5.7 points. On the first inspection all plants were below the standards set for them. The greatest improvement for any plant is an improvement of 12.5 points for one of the small plants. This plant, on the first inspection, stood at 10.2 points below standard. On the last inspection it rated 2.3 points above standard. There are four plants completely free of red areas (areas more than 10 points below standard) and one plant which has neither pink nor red areas. The increase in gold areas (areas more than 5 points above standard) is also noteworthy. It is not to be assumed that the rating system is solely responsible for this improvement. There are many contributing factors. The rating system does measure progress or failure of factors which influence sanitation.

Enhances Cooperation

The keynote to the relative success of the rating system in these plants is the fact that it makes for more consistent personnel interest and cooperation, always difficult to secure for a sanitation program. Criticism of existing conditions is directed at situations rather than people, and is constructive in that it helps to educate individuals in devising methods for correction of problems. Employees realize that they are being rated on a just basis and that any improvement will show up when they are rated.

Furthermore, thorough regular inspections impress upon personnel the fact that management has a strong sustaining interest in sanitation, and that any lapses will be noted. It is our experience that the knowledge of thorough inspections to come is a much better stimulant to the maintenance of a high sanitation level than reprimands or penalties for defaulting.

Employee Recognition

We hope in the future to put even more stress upon employee recognition. At present, departmental and plant performance maps are posted on the plant bulletin boards, as are the red rating sheets themselves, on occasion. This has a stimulating effect upon operators and supervisors and leads to a rather wholesome spirit of competition.

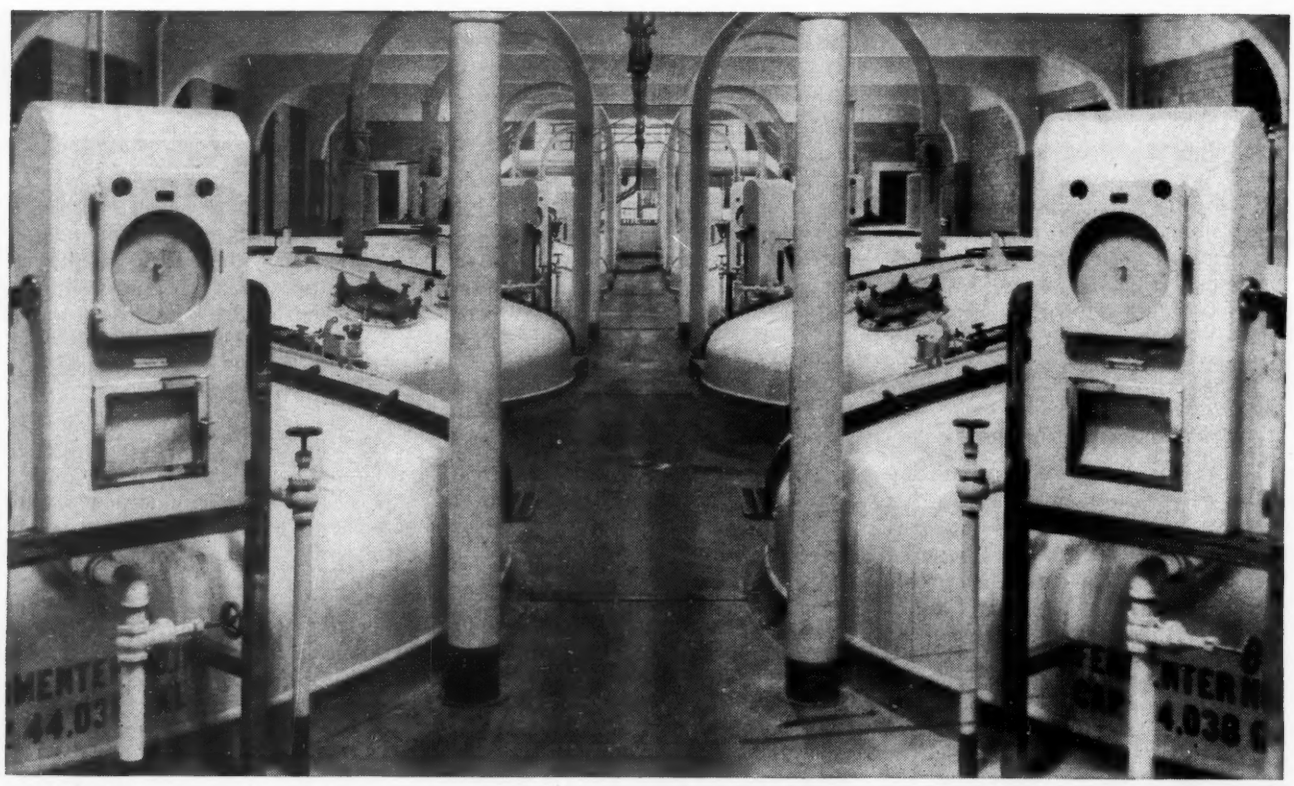
Photographs are now taken of problem areas or of particularly clean areas. We are also planning to utilize 16 mm. movie cameras to illustrate sanitation problems more vividly. This should aid materially in stimulating greater employee participation in the sanitation program. Pictures are widely circulated through the plant papers and magazines. Greater publicity through these channels and a regular poster campaign for higher sanitation levels should serve to make every employee in every plant "sanitation conscious." Once this is achieved, half the battle is won.

Sanitation Reports

Considerable publicity is now given to sanitation levels through supplementary reports which are issued from time to time. These reports receive wide circulation throughout all the plants and are usually devoted to comparative analyses of sanitation levels, pointing out spectacular improvement or particular problem areas. In these reports wide use is made of photographs and graphs.

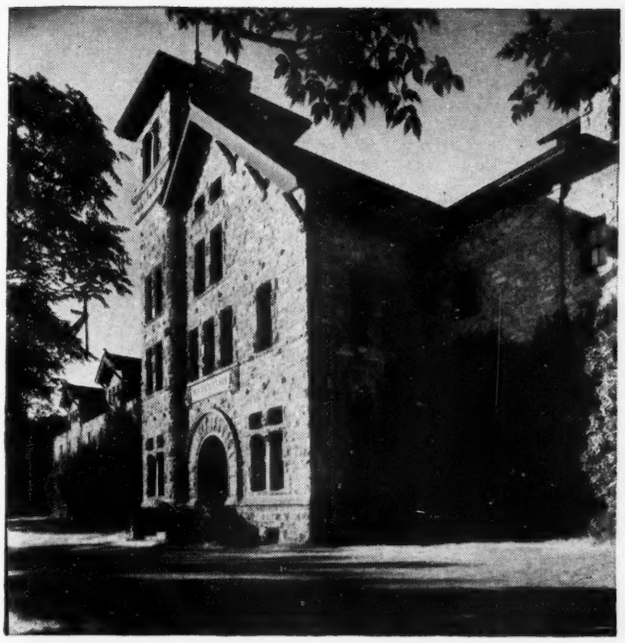
At the present time we are working out a simplified rating form which will enable the rater merely to check the conditions he finds, rather than take time to write in comments. Such a form, however, can be based only upon detailed study of comments occurring on the ratings forms over a period of time.

We hope that when we are ready to release our new rating form, our experimentation will prove it to be just as comprehensive as the present form. We are experimenting also with three-dimensional floor plans which would make the sanitation picture as shown by the colored maps more vivid to all personnel using visual sanitation aids.



PRODUCTION areas must be kept clean and orderly because appearance of these areas has a bearing on the quality of the product that is produced. These areas are also frequently under observation by visitors and, therefore, have a strong public relations value.

A SPECIAL FOOD INDUSTRIES REPORT.....



WINE making in California dates back to the 18th century. Greystone Winery, near St. Helena, was built in 1889.

GRAPES for dessert wines and bulk table wines are hauled in gondolas. Picture taken at Italian Swiss Colony Winery, Asti.

HOW CALIFORNIA WINES ARE MADE

By W. V. CRUESS, Professor of Food Technology
College of Agriculture, University of California, and
C. R. HAVIGHORST, Associate Editor, "Food Industries"

In this special report, the first of a new series, FOOD INDUSTRIES *presents an over-all review of the progress of wine manufacture in California since the repeal of the 18th Amendment. Adoption of modern methods and the use of modern equipment have resulted in substantial increase in volume and marked improvement in quality.*

CALIFORNIA climate is favorable to the growing of *Vinifera* (European) varieties of grapes from which European-type wines can be made. Most other states grow only the American ("slip skin") varieties, owing to winter killing of the European varieties in these other states.

The pioneering Franciscan priests who built the California missions late in the 18th and early in the 19th Centuries brought grape cuttings or seeds or both from Mexico and established vineyards and wine making at the missions. But it was not until after the Civil War that grape growing expanded greatly and commercial wine production became important. Much of the early wine was very poor—often vinegar sour or lactic sour, and otherwise defective.

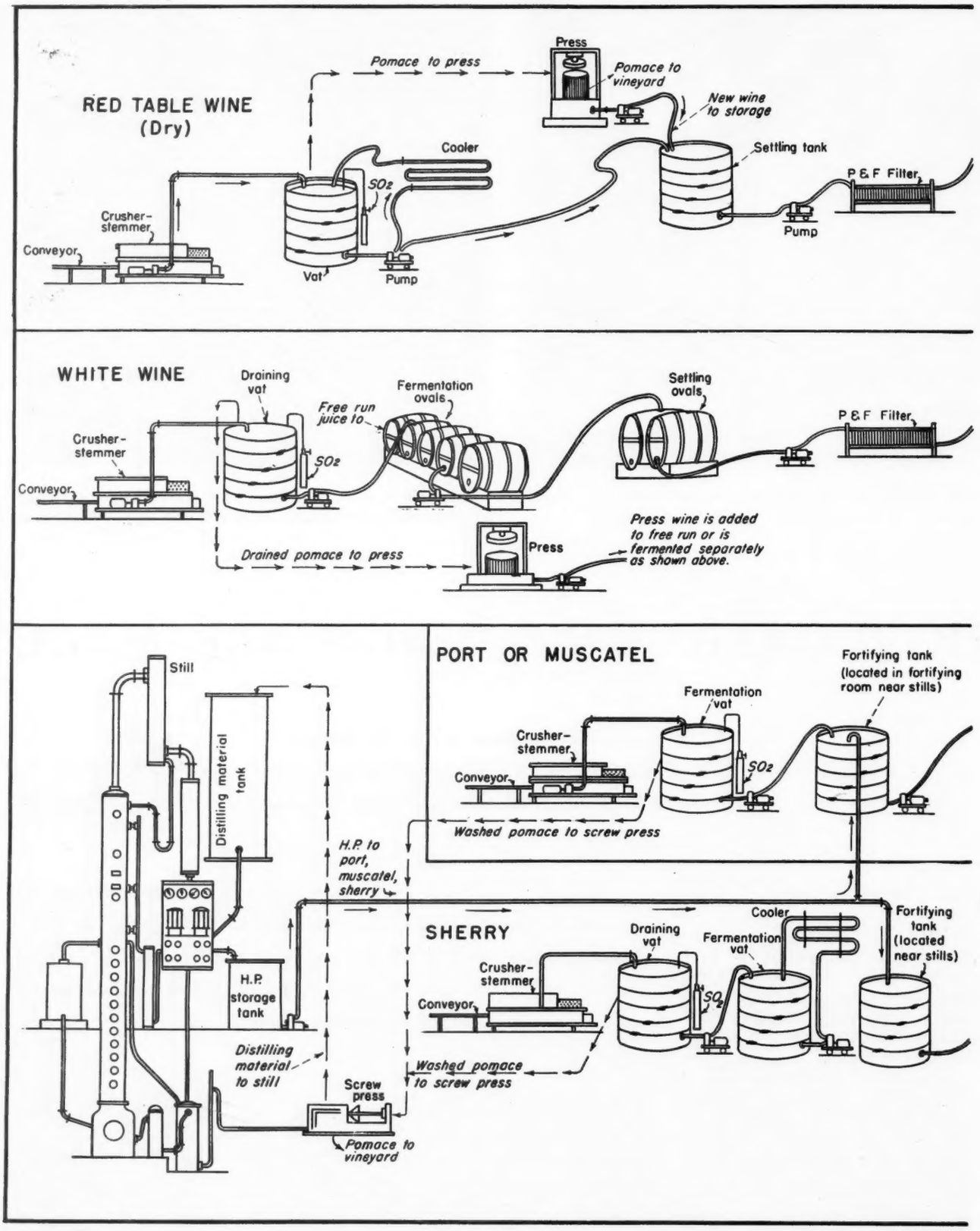
In the late '90's and early 1900's, through the efforts of the University of California, the improved methods of control of fermentation through use of SO_2 to control bacteria, addition of pure yeast, and cooling, in use in France, were introduced and resulted in marked improvement in quality.

During prohibition more wine was made than before adoption of the 18th Amendment. Most of it was made in basements in the large cities for family use, and most of it was very bad. But it provided an excellent market for California wine grapes.

Since repeal of the 18th Amendment about fifteen years ago, the wine industry in California has not only re-established itself but has greatly expanded output, compared with that of the pre-Prohibition era. This growth is illustrated by the statistics given in the accompanying Table I. It will be noted that in pre-Prohibition years more table wine than dessert (fortified) wine was made. Since Repeal the reverse has been true, except in 1933.

In the first two or three years

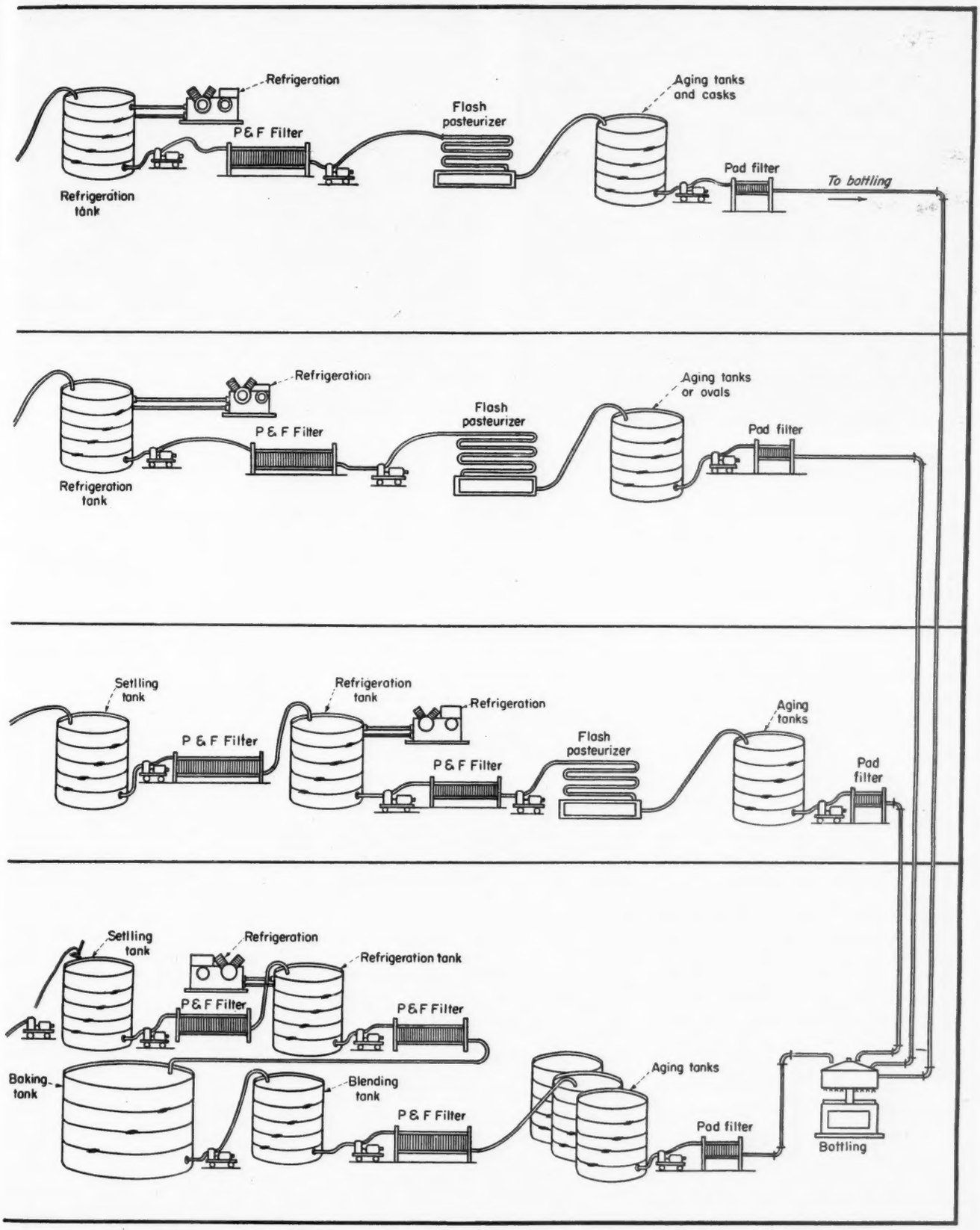
Sulphur Dioxide, in Traces, Kills Undesirable Microorganisms



FLOW DIAGRAM shows the handling of table wines and dessert wines in typical winery practice. Flow lines at top are for table wines (red wine and white wine). Flow lines at bottom are for dessert wines (port or muscatel and sherry). In order to simplify the schematic arrangement, single vats or tanks are shown at many stages of the process where in actual winery operation several production or storage units would be used. Cooperage ranks high on list of winery equipment.

FORTIFICATION tanks for port and sherry, although shown adjacent to the fermentation vats in the diagram, are in actual practice located in the fortifying room near the brandy stills, in accordance with Federal Regulations. The addition of high proof brandy is carried out under the supervision of the U. S. gauger. Fermentation stops when the high proof (or neutral spirits) has been added. For this reason, industry leaders consider the term "fortification" has a false connotation.

Pad Filters are Used for Polishing the Wine Before Bottling

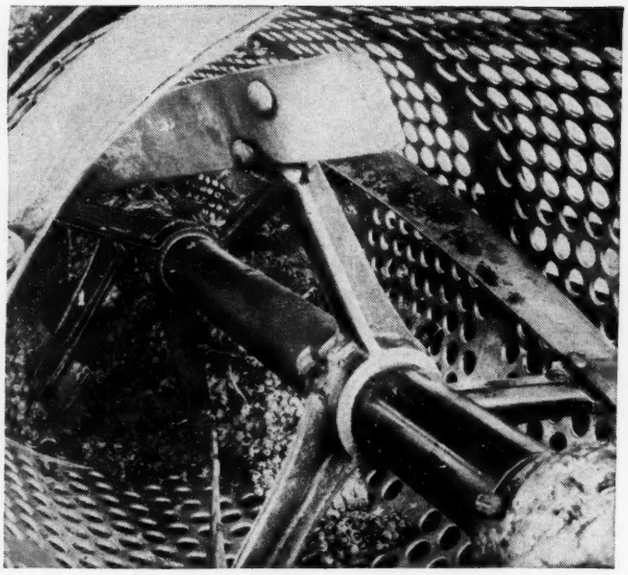


CELLAR arrangements in producing winery would permit grouping of much of the equipment. Flow lines in drawing are arranged for ready identification of operations. Storage cellar usually holds various kinds of wine and is equipped with pumps for racking off. Sediment or lees are collected, sent through for alcohol and tartrate recovery. Refrigerated cellar has tanks, heat exchanger, refrigeration equipment. Aging cellar houses tanks and ovals, filter press, flash pasteurizer.

BAKING of sherry imparts an amber to brown color and a cooked taste and bouquet or odor. Concrete tanks of 60,000 gal. may be used, or redwood tanks holding 20,000-30,000 gal. Baking is usually at 120-140 deg. F. for two or three months. Baked wine is cooled, sweetened slightly with Angelica, filtered or fined, aged, polish-filtered and bottled, or shipped in bulk. A finer sherry is made by omitting baking and using, instead, slow aging in oak butts or puncheons for two years.

Grapes For Fine Wines are Specially Handled at the Winery

LUG BOXES are used for grapes for fine table wines. Grapes for making European-type wines grow well in California.



GAROLLA or Italian type crusher-stemmer has replaced roller crushers. Grapes fall through, stems are kicked out.

after Repeal, unpalatable wine and wine of poor quality was often the result of inexperience on the part of many who hastily engaged in wine production. By means of an intensive educational campaign, consisting of publications, visits to wineries, short courses, and conferences, the University of California, during the early post-Repeal years, thoroughly acquainted the new wine makers with the basic fundamentals of making sound wine. Its graduates, trained in wine chemistry, microbiology, and wine technology, also have been a very important factor in improving the quality of California wines. There are at least ten times as many scientifically trained men in wineries at present than before passage of the 18th Amendment. Every large producer has one or more university trained men. Most of the medium-size wineries have a laboratory and a chemist. Quality and composition are closely controlled, not only by the ancient art of tasting, but also by laboratory examination.

Shortage of Fine Grapes

While the average quality of California wines is much above that of the "run of the mill" wines or "vin ordinaire" of Europe, nevertheless the state's annual production of fine wines is much less than it should be, because of the shortage of fine grape varieties. A greater premium is needed in the way of price to growers of fine varieties such as the true Riesling, Semillon, Pinot noir, Chardonnay-Muscat frontignane, and others. Certain medium-size and small wineries grow their own fine varieties, and consequently enjoy an enviable reputation and premium price for their fine wines.

Also, the quality of the popular-priced wines could be improved by the growing and use of more of the better, but not superfine, wine grapes such as Carignane, Barbera, West's White Prolific, Palomino, Burger, and others.

At present, in contrast to the trend of other foods and food adjuncts, the prices of common wines have dropped to ruinously low levels. Various possible causes of this decline have been offered, among them the increase in other cost-of-living items, overproduction in 1946, overstocking of distributors in 1946, and possible poor quality of some of the wines distributed in the lush years of 1944, 1945 and 1946. There are signs at present that the market is slowly recovering, but the tremendous production of 1946 has been a serious handicap. It is expected that the final 1947 output figures will be far below those of 1946.

So much for general comment on California wines. We shall now discuss briefly how California wines are made.

Wine Districts: The better table (dry) wines are made from grapes grown in coastal counties such as Napa, Sonoma, Santa Clara, Mendocino, Contra Costa and Alameda Counties. Much of the bulk table wine is produced in the central portion of the great interior valley, notably in San Joaquin, Stanislaus, and Sacramento Counties, and in southern California. The Fresno, Madera, Kings and Tulare Counties area is noted for its dessert wines, and the Livermore Valley for its sauternes.

Picking: For table wines the grapes should be picked when their juice tests 21 to 23 deg. Balling or Brix, and for dessert wines, 23 to 28 deg. Balling. The bunches are cut from the vines by a knife with a short curved blade and the grapes are placed into 50-lb. lug boxes.

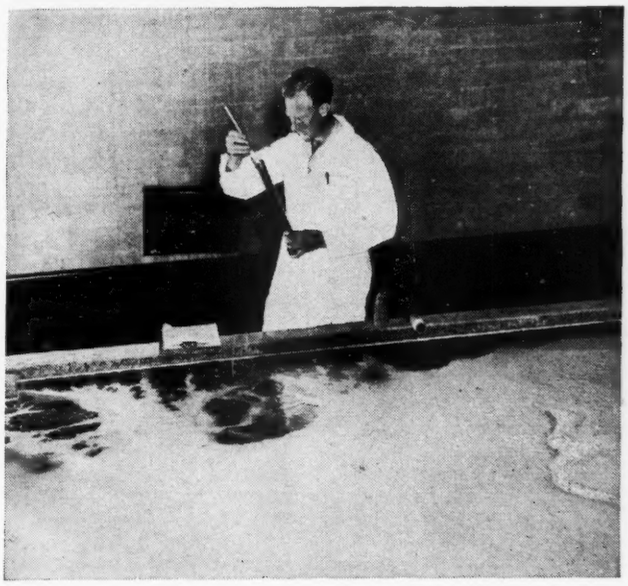
For fine table wines the grapes are transported by truck in the lug boxes; for bulk table wines and for dessert wines the lugs are emptied into gondola-type trucks and hauled in bulk to the winery, where the truck body may be tilted and emptied into the conveyor, much as a load of gravel is dumped.

Crushing and Stemming: In the

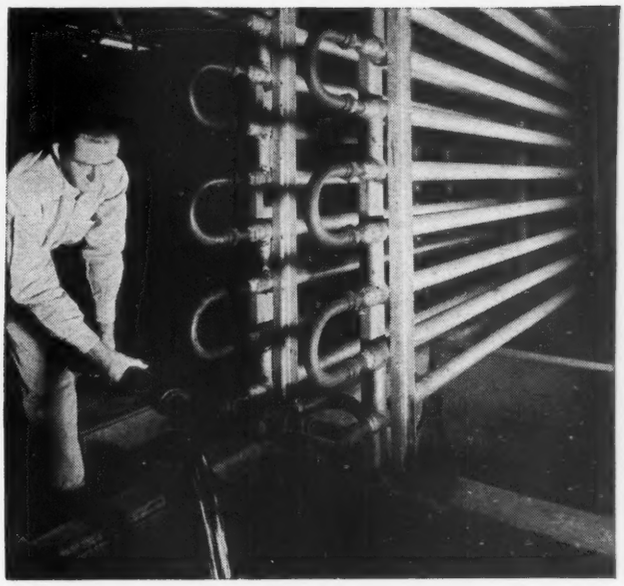
TABLE I—COMPARISON OF OUTPUT of Pre-Prohibition and Post-Repeal Wines in California

Year Average	Table wines (dry wines)	Dessert wines (fortified wines)	Total gallons
1909-1913	24,434,000	19,161,000	43,950,000
1933	19,627,000	16,052,000	35,679,000
1935	11,677,000	54,013,000	65,690,000
1940	21,810,000	79,008,000	100,818,000
1945	33,617,000	82,717,000	116,334,000
1946	49,970,000	127,664,000	177,634,000

Concrete Fermentation Tanks may Hold up to 60,000 Gallons



FERMENTATION tanks are frequently made of concrete. Use of SO_2 promotes clean fermentations, does not affect wine yeast.



COOLERS are frequently used to control fermentation temperatures. Cooling was adopted 50 years ago, with other aids.

old-style French crusher, in general use until recently, the grapes were crushed between fluted metal rolls revolving toward each other. The crushed grapes were separated from the stems in a horizontal metal cylinder with circular openings about one and one-half inches in diameter. Rapidly revolving paddles kicked the stems out the end of the stemmer, and the grapes fell through the openings into the crusher sump.

The French crusher-stemmer has largely been replaced by the modern Italian-type crusher-stemmer generally known as the "Garolla Crusher," now made in California. It consists of two concentric, revolving cylinders with many circular openings and rapidly revolving paddles inside the larger cylinder. The crusher rolls of the French machine are omitted. The grapes are crushed and stemmed by impact; the crushed grapes drop through the holes of the cylinder into the sump, and the stems are kicked out the open end of the machine.

The grapes are fed to the crusher-stemmer by conveyor and elevator. The larger wineries have several crushers so that truckloads of grapes may be unloaded promptly.

Pumping the Must: The stemmed, crushed grapes are usually called "must," although the juice is also known as "must." Formerly a large bore, bronze plunger pump with ball valve was universally used for pumping the crushed grapes to the red wine fermentation vat or the white wine draining vat. The newer installations used centrifugal pumps.

The crushed grapes are pumped from the sump beneath the stemmer through a large diameter pipe to the vat. This pipe should be of stainless steel, but is more often of plain steel or copper. While some metal is picked up by the must, it is believed that most of it is precipitated during fermentation with the yeast.

SO_2: In the old days, nature was allowed to take its course, and no attempt was made to inhibit undesirable bacteria and wild yeasts. Consequently, the wine often became vinegar or lactic sour. Since Repeal, the addition of a small amount—100 to 150 ppm.—of SO_2 to the must, has become universal. It kills or inhibits undesirable micro-organisms, but does not adversely affect the true wine yeast. In other words, it promotes clean fermentations. It is added in the crushing vat as a 3 to 6 percent solution of SO_2, or as the gas, or as a bisulfite. All of these forms are satisfactory. If added slowly as the vat is filled, distribution of the SO_2 is usually good.

Draining of Free Run: In the making of white table wines and Angelica, also Muscatel in some plants, the freshly crushed grapes are allowed to drain into a concrete sump and the resulting juice is pumped to a fermentation vat, oval or tank. In some wineries draining of free run is done immediately; in others, the crushed grapes are allowed to stand overnight in order to dissolve some tannin from the skins and to obtain a higher yield of juice. The addition of six to eight pounds of commercial pectic enzyme per ton increases the yield of free run and facilitates pressing.

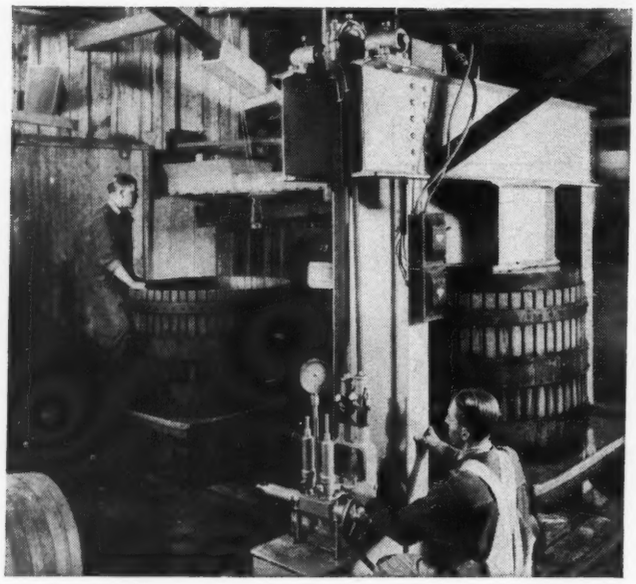
Vats, Tanks and Ovals: Fermentation vats are open, circular redwood tanks of rather shallow depth, or are rectangular open concrete tanks. Fermentation vats range from about 1,000 gallons to more than 60,000 gallons in capacity.

Tanks are either of redwood or of concrete. They differ from the usual fermenter in being covered and are usually deeper and larger.

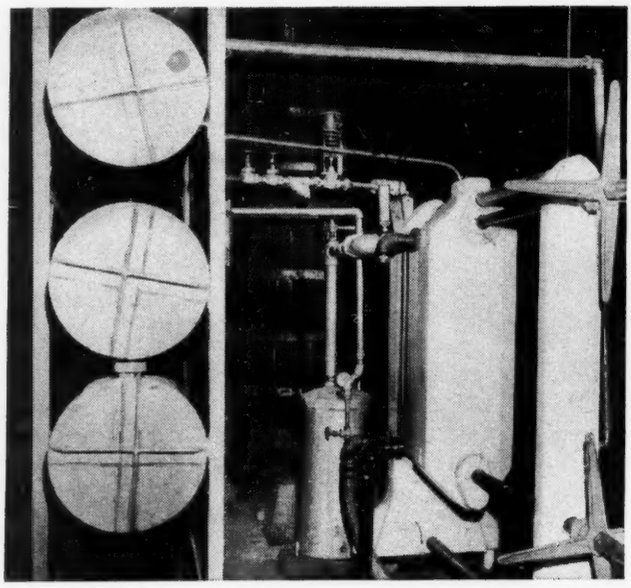
Ovals are usually of oak and at present practically unobtainable, owing to the scarcity of long oak staves. Ovals are used for fermentation and aging of white table wines and range from about 500 gallons to about 3,000 gallons, but the latter size is very exceptional.

Pumps: Every winery has one or more portable centrifugal or plunger pumps for racking (drawing off) wines from one tank to another, for pumping over during fermentation or clarifying, and for pumping wine through refrigerators, filters or pasteurizers. At the crusher-stemmer is a large bore stationary plunger or centrifugal pump, as previously mentioned. In large wineries there may be stationary pumps at the racking sump and elsewhere, usually centrifugal. They should be made of corrosion-resistant

Addition of Peptic Enzyme Increases Yield of Free Run



HYDRAULIC presses at Cresta Blanca Winery, Livermore. Basket is for red wines; racks and press cloths for white.



FLASH pasteurizers of the Walker-Wallace type are rapidly replacing tubular type heat exchangers. Left, holding chambers.

bronze or of stainless steel, since traces of Fe and Cu cause haziness in white wines.

Filters: Wine filters are of several types; the two most common are plate and frame filter presses of customary design, and the screen plus infusorial earth filters, in which a layer of filter aid is built up on hollow leaves made up of very fine screens of stainless steel or other corrosion resistant alloy or metal. Plate and frame filters are made of aluminum or aluminum bronze, stainless steel or other corrosion-resistant material.

For finishing or "polishing," a plate and frame pad filter in which asbestos pads are held between metal frames is generally used. The pads should be free of soluble calcium, as it causes deposition of calcium tartrate crystals after bottling. Unglazed porcelain candle filters, and also wood pulp filters, have been used but have been largely replaced by plate and frame or screen filters.

Pasteurizers: Until fairly recently the customary wine pasteurizer consisted of a heat interchanger made up of a bank of jacketed, horizontal copper tubes surmounted by a battery of smaller horizontal copper tubes in a large steam jacket. The cold wine was preheated by counter flow through the heat interchanger as the heated wine flowed outward through the jackets; and pasteurizing temperature, usually 180 to 190 deg. F., was attained in the steam-jacketed heater. At present stainless steel or aluminum or aluminum alloy is used, and instead of the old tubular heaters and heat interchangers, hollow plate pasteurizers of the Walker-Wallace type ("A.P.V.") have been or are being installed to replace the old copper outfits. Also, beyond the pasteurizer is usually a stainless steel holding chamber to increase the plate pasteurizer's capacity and to insure thorough pasteurizing.

Over 90 percent of California common or table wines are pasteurized. Some fine wines, however, are not pasteurized, and some are not refrigerated.

Refrigeration: New wines, after rough filtration or Bentonite fining, are, in most wineries, chilled to about 24 or 25 deg. F. for table wines, and to about 14 to 16 deg. F. for fortified dessert wines for a couple of weeks or longer, to cause separation of excess potassium bitartrate (cream of tartar) and cold precipitable colloids and thus ensure that the wine will not deposit cream of tartar or cold precipitable colloids in the bottle.

The preferred procedure is to chill the wine to the desired temperature by passage through the tubes of a direct Freon or NH_3 cooled refrigerating machine into a tank located in a cold room held at 32 to 25 deg. F. However, in many wineries the tank is located at cellar temperature and periodic chilling of the wine is used to maintain temperature. After sufficient refrigerated storage, the wine is filtered cold and the cream of tartar periodically recovered from the walls and bottom of the tank.

Bottling: During the war a revolution took place in the marketing of California wines. Previously, much, probably most of it, had been shipped in bulk in enamel lined tank cars to distributing centers for bottling. But during the war, bottling at the winery became the vogue and still continues.

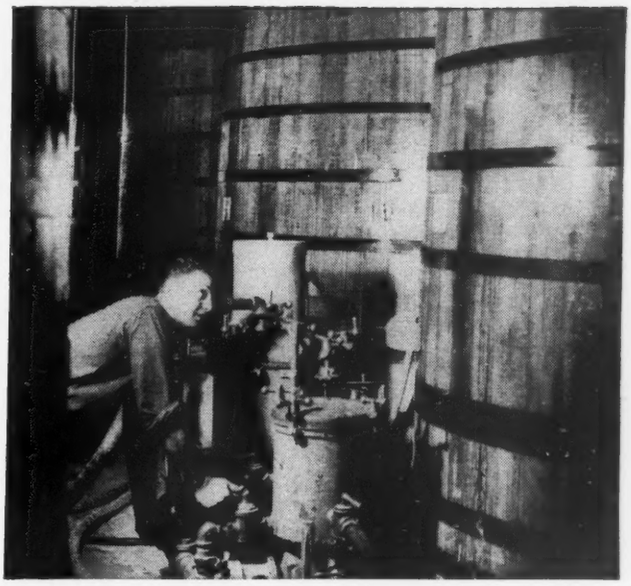
In the larger plants, high speed, automatic bottling machines, such as the Horix and Mojonnier fillers, are used. In the smaller wineries, semi-automatic hand fillers are found. In all cases they should be made of stainless steel.

If screw caps are used, they are applied by machine in the large plants. Corks if used are softened and sterilized in hot water containing SO_2 and glycerine, then inserted by semi-automatic or by foot power corking machines that compress the softened cork to bottle neck diameter, thus squeezing out excess water before inserting the cork in the neck of the bottle. Corks are generally used for table wines, and screw caps for dessert wines.

Producing Distilling Material: In dessert wine wineries, water is added to the drained pomace and the mixture fermented dry (nearly sugar-free) to give a wash of about six percent alcohol. This is drained off. More water is added

Cooperage is Highly Important in Production of Wine

OVALS, commonly used form of cooperage, are difficult to obtain owing to shortage of oak staves. Manhole permits access.



SCREEN-TYPE filters (clamp top tanks, foreground) are used as wine passes from aging tanks (background) to bottling room.

and drained off to be added to another batch of new pomace, and the pomace is pressed and the press liquid sent to a tank of fresh pomace or to the still. In some plants the pomace is hammer-milled with the wash to a slurry which is run through special stills.

Distillation: The distilling material is collected in a measuring tank in the still house and is measured and analyzed by the U. S. gauger. It then goes through a preheater to a column still, entering part way up the column. As it drops from plate to plate in the column, steam passes through it and the vapors travel upward from plate to plate, being concentrated in alcohol content by repeated vaporizations and condensations. They pass through a dephlegmator above the still that condenses out some water and returns it to the still. The alcohol is then condensed. It may enter a second column for further concentration. The high proof is collected in a lock metal tank and periodically weighed or measured under the supervision of the gauger for fortification of dessert wines.

Fortification: The fermenting must or new wine is transferred to a fortifying tank, analyzed for alcohol content, measured, and the calculated amount of high proof brandy added under the gauger's supervision. The bandy and wine are thoroughly mixed by stirrers, or pumping over, or by aeration. It must be thorough and requires time. The fortifying tank is in a separate room. The wine is usually fortified to 20 to 21 percent alcohol.

Fining: The term "fining" signifies clarification of wine with casein, gelatin and tannin, or with Bentonite or other clarifying agent. In some dessert wineries the new wines are fined with powdered Bentonite added at the rate of about four to eight pounds per 1,000 gallons, followed by pumping over to mix. Fine table wines are usually fined later in their lives with tannin and gelatin. Bulk quality table wines are often fined with Bentonite. Gelatin is usually dissolved in warm water or warm wine before addition. Much less gelatin than of Bentonite is required per 1,000 gallons.

After the fining agent is added to the wine, the wine is allowed to settle, and is then drawn off from the sediment. Some dessert wine producers rely entirely on filtration and do not fine their sherries, ports, etc.

Making Red Table Wine: In making red table wine the flow sheet is about as follows:

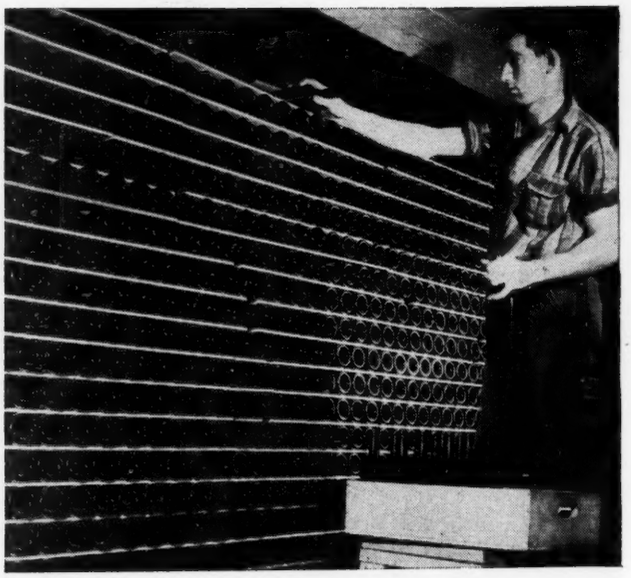
The grapes are crushed, stemmed, pumped to fermentation vats; given about 100 to 150 ppm. of SO_2, a 2 to 3 percent starter of must fermenting with pure yeast, and the vat is pumped over or punched two to three times daily to help extract the color of skins and to prevent acetification in the "cap" (top layer of skins). It is tested three times daily for Balling degree, and the temperature maintained below 85 deg. F. by occasional counter current cooling. The free run juice is drawn off at about 0 to 2 deg. Balling (when color extraction is sufficient), the pomace is pressed and the press wine is added to a vat of freshly crushed grapes. The free run wine is fermented out bone dry in a covered storage tank which is completely filled and closed after fermentation is complete. The wine is racked when well settled (November and December) into another tank or into oak barrels or puncheons, for aging for 2 to 4 years. It is racked in each fall or winter and spring, filtered or fined, refrigerated, aged, flash pasteurized, filtered or fined, and bottled or barreled. If bottled, the bottled wine is stored in bins six months or longer to "mellow up," and so that the vintner can determine if it will "hold up" in the bottle.

White Table Wine: Procedures vary somewhat; the following is a composite flow sheet for white wines of ordinary quality. Crush and stem, pump to vat, add SO_2, drain off free run, press the pomace and keep press juice separate, ferment both with pure yeast in ovals or covered tanks, cool as necessary to keep temperature below 70 deg. F. From this point handle as outlined for red table wine.

Sweet Sauterne: Make a dry white table wine as previously described. Age it. Then add clear muté, clear juice preserved with

Bottling at the Winery Came into Vogue During the War

FILTERED wine passes to filling machine (right), then bottles are corked (left). Concannon Winery, Livermore.



BOTTLED wine is frequently stored in bins six months to mellow and to prove that it will hold up in the bottle.

SO_2, to give desired sweetness. Pasteurize. Cool. Filter. Add SO_2 to 350 ppm. or more as preservative, bottle. Or flash pasteurize to 140 to 145 deg. F. and bottle hot to preserve it.

Or use very ripe grapes of 26 to 28 deg. Balling and arrest the fermentation with a heavy dose of SO_2 at 2 to 4 or 5 percent residual sugar. Age, etc., but maintain sufficient SO_2 to prevent further fermentation.

Muscatel: Crush, stem, pump to vat, add SO_2 and yeast, ferment to about 14 to 15 deg. Balling, draw off free run and fortify to about 20 percent alcohol with 185 to 190 proof brandy, settle, rack, fine with Bentonite or filter, refrigerate to detartrate, filter cold, flash pasteurize, cool, filter, age, filter, bottle. The finished wine should contain about 20 percent alcohol and be of 6 to 8 deg. Balling, i. e., a 20 x 6 to 20 x 8 wine Grape concentrate is sometimes added to sweeten.

Port: The procedure is similar to that for Muscatel if the grapes are of good color. If the color is poor it may be necessary to extract the color from the skins by heating the crushed grapes to about 120 deg. F. for several hours, then draining, pressing, cooling, and fermenting. Or part of the crushed grapes are fermented nearly dry to extract color, pressed and fortified to give a dry Port of high color. This is blended with Port of high sugar content and poor color to give a blend of normal color and sweetness. Or grape concentrate may be used to sweeten.

Port is usually about 20 x 6; 20 percent alcohol and 6 deg. Balling.

Sherry: By the usual California process a dry white wine is first made, preferably from Palomino grapes, although usually of other varieties such as Flame Tokay, Malaga and Thompson seedless. This dry wine is fortified, settled, racked, filtered or fined, detartrated, filtered, and "baked" in concrete tanks of about 60,000 gal. capacity, or in redwood tanks of about 20,000 to 30,000 gal. capacity. The baking is usually at 120 to 140 deg. F. for two to three months. It imparts an amber to brown color and a cooked taste and bouquet or odor. The baked wine is cooled, sweetened slightly with Angelica, filtered or fined, aged, polish-filtered and bottled or shipped in bulk.

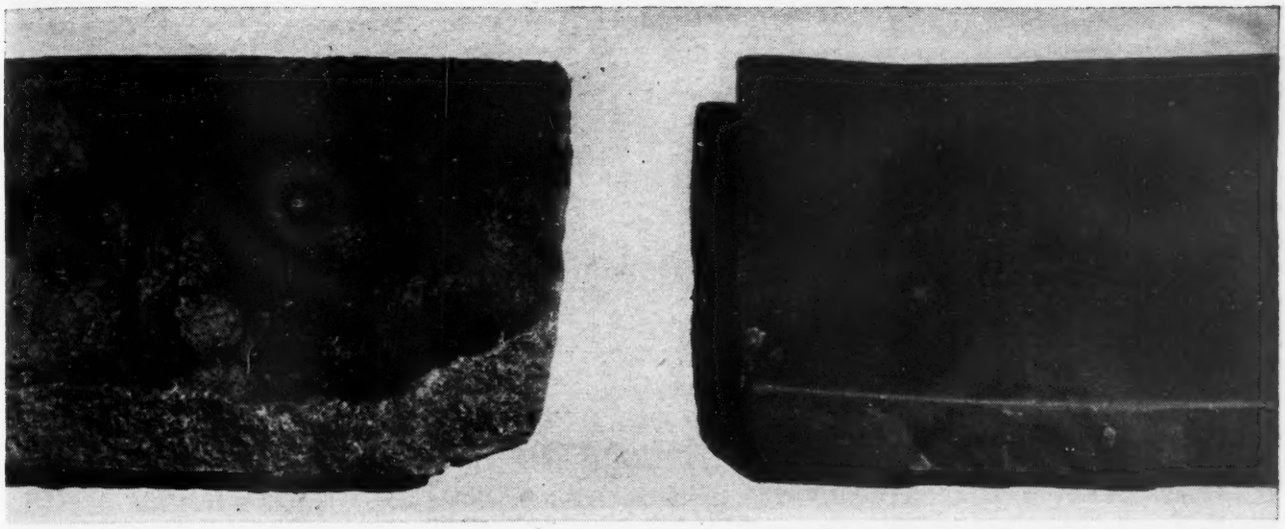
A finer sherry is made by omitting baking and using, instead, slow aging in oak butts or puncheons for two years or longer. It is to be hoped that this method of aging will come into greater use.

Angelica: This is made about as described for Muscatel, but may be allowed, in some cases, to ferment to only 1 or 2 percent alcohol to, say, 20 to 22 deg. Balling, before fortification in order to give a very sweet wine, useful in sweetening or "balancing" Port, Muscatel and Sherry. It is much less in demand than the other fortified dessert wines.

Bulk "Champagnes": Much "champagne" or sparkling wine is made by the Charmat bulk procedure. First a fine table wine is made and aged until nearly ready for bottling, fined or filtered, sweetened to about 2 percent sugar and fermented with Champagne yeast in closed stainless steel tanks of about 15,000 gallons capacity to about 5 to 6 atmospheres pressure, chilled, filtered under isobarometric CO_2 pressure, bottled, corked, binned and aged in the bottle until the wine is smooth and mellow.

Heavy Metals in Wine: Dissolved copper in traces causes haziness of bottled wine. Iron may cause a greenish sediment or haze. Tin may also cause trouble. For these reasons metal equipment in contact with wine should be of stainless steel or other corrosion resistant metal. Heavy metals can be removed by fining with potassium ferrocyanide, "blue fining." At one time its use was prohibited, then for a year or two the F&DA and A.T.U. permitted it, but at present it appears to again be under ban.

The Wine Institute: The wineries of the state formed a trade association known as the Wine Institute soon after Repeal. It is very active in promoting improvements in wine making, gathering statistics, serving the wineries' interests in Washington, promoting the use of wine through its affiliate, the Wine Advisory Board, and by being generally useful and helpful to the wine industry. Its headquarters are in San Francisco, at 717 Market St.



CONTRASTING samples of chocolate show (left) poor appearance of improperly tempered material with greasy discolored surface and grainy cross section, and (right) glossy surface and fine-grained cross section of properly tempered chocolate.

How To Temper Chocolate

Careful control of melting and cooling operations gives chocolate dense crystal structure, desired brittleness and glasslike surface

By WILLIAM G. WOLFE, Plant Superintendent, Cook Chocolate Co., Chicago, Ill.

THERE is a great similarity between tempering steel and tempering and molding chocolate. You know perhaps that if a piece of steel is heated to a certain point and then cooled quickly in water, a hard brittle structure is obtained with a very fine grain, such as in a file.

If, however, the steel is overheated and then quenched, instead of a fine grain you will get a coarse grain with very little strength and the structure will be poor. And if the steel is not heated enough, there will be no appreciable change in structure. The same thing happens to a great extent in chocolate.

The parallelism with chocolate tempering may be indicated by the successive operations of (a) melting, (b) cooling and (c) holding in molten state for use. The temperature to which chocolate is heated for melting and the time of cooling, as well as the temperature to which it is cooled, vary with the type of chocolate and determine the character of the crystal structure as they do in steel tempering. The objective is to obtain a hard, dense cross-section structure with a steel-like fracture when broken and a glossy external surface which does not feel "greasy" when handled. Because of its non-homogeneous composition, molten chocolate has to be agitated to avoid settling of non-fat solids.

Precautions Necessary

Melting is usually done before the chocolate reaches the tempering kettle. The chief precaution to be taken is to keep the melting temperature not lower than 100 deg. F. nor higher than 110 deg. F. The lower temperature should be attained to assure complete melting and uniform distribution of fat and non-fat solids components. The higher temperature should not be exceeded as a matter of economic use of steam and water. In the case of milk chocolate, its texture and flavor are destroyed, under usual handling conditions, if it is heated over 120 deg. F.

Cooling requires from 20 to possibly more than 60 min., depending upon the capacity of the tempering kettle and the season of the year. Chicago water in the winter time averages 52 deg. F. or slightly lower. During the summer it is often over 70 deg. F.

Cooling water should be run through the kettle jacket sufficiently slowly to avoid solidification of chocolate on the inner surface of the kettle and flaking off as the scraper agitator rotates. Further, if the temperature decreases too rapidly there will not be proper equalization of temperature throughout the mass of chocolate in the kettle, and the beginning of fat-crystal formation will not take place at the same time throughout the mass as it will if the cooling is done gradually. If water conditions are abnormal so that the prescribed conditions for temperature and time will not give a correctly tempered chocolate, cooling temperature should be lowered one or more degrees or the cooled chocolate should be held an additional 5 or 10 min. before casting or being sent to the depositor.

An experienced operator has a visual check on the correctness of temper which is often an aid when water temperatures are unusual. He looks for a slightly gray, smoky film formation on the surface of the chocolate in the kettle as it nears the correct molding temperature or

(*Continued on page* 226)

DRAWN ALUMINUM cans are used by the Norwegian canneries for packing sardines and many other fish products for export. These cans differ in shape. They may be circular, oval, square or oblong. Strength of cans is increased by using corrugated lids and bottoms.

Will We Follow Europe In the Use of Aluminum Cans?

Although Norway is using aluminum cans in quantity, their adoption in the U. S. is being held back by cost differentials, and other factors

By JOHN V. ZIEMBA,
Assistant Editor,
"Food Industries"

AT least two factors will determine whether or not the U. S. follows Norway in the use of aluminum cans for packing food. One element is the relative cost of aluminum and tinplates in the two countries. Another is the need for high speed fabricating and coating machinery.

Of the two factors, cost of raw material is regarded as basic. Differential between tinplate and aluminum is much less in Norway than in the U. S. The other factor, special machinery, is not one to deter U. S. engineers when its construction is warranted.

Of incidental significance are the cost of tin and the relative weights of tinplate and sheet aluminum to make a can of given size. More important are three other considerations:

1. No country has developed high speed machinery for making seamed cylindrical cans, as yet.

2. Depending on what goes in it, an aluminum can may need lacquering, anodizing, or both.

3. Aluminum cans usually have lower mechanical strength, calling for special handling during processing and careful packing and shipping.

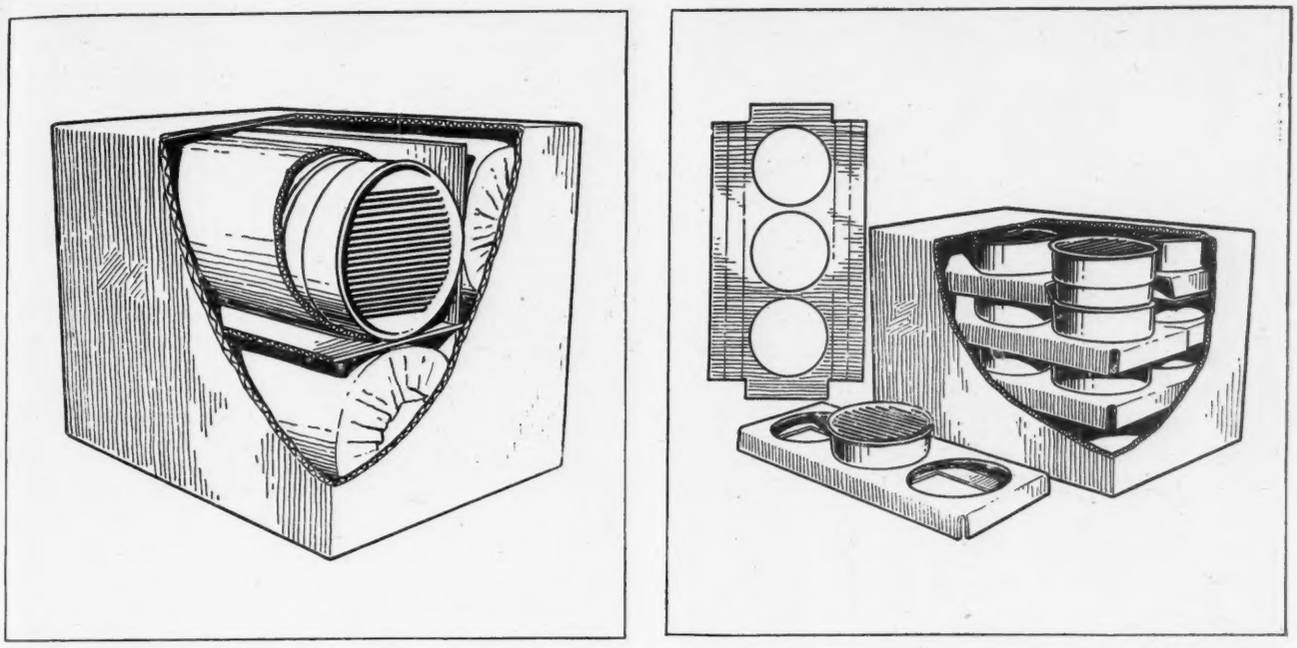
In addition to the foregoing, so many new and profitable uses have been found for aluminum since the war that there has been little incentive to divert this material for the making of cans in the U. S.

Aluminum cans cannot be made on existing high speed tin can machines by reason of the soldering problem with aluminum as well as owing to differences in the working properties of the metal. Welding is not the answer to the problem. The use of aluminum for manufacturing containers is accordingly limited at present to: (1) Drawn cans, (2) extruded cans, (3) cans with non-soldered side seams (cemented), and (4) aluminum ends with tinplate bodies. Drawn cans are stamped out in one operation on high speed automatic presses running at 8,000 an hour. The drawn cans are being used in Norway for sardines (see FOOD INDUSTRIES, December, 1946).

Cost of Aluminum Cans Less in Norway

Aluminum cans are being used in greater quantities in Norway because they are only slightly more expensive there than tinplate cans. The slight difference in cost between aluminum and tinplate cans is attributed to the greater shortage and higher cost of steel and tinplate in that country than in the U. S. Furthermore, aluminum is the only metal, other than steel and tinplate, that is available for metal food containers in Norway.

The Norwegians predict that in the near future the cost of aluminum cans will be equal to that of tinplate cans in their country. They feel that the price of tinplate cans will steadily increase, while the



SPECIAL CARTONS are needed to ship food packed in aluminum cans to prevent damage to cans. Two types of cartons will withstand rough handling. One type (left) has cans packed in cardboard tubes; the other (right) in perforated inserts.

price of aluminum containers will gradually decrease.

Contrary to opinion in the U. S., the Norwegians do not believe it necessary to make aluminum cans equal in strength to tinplate cans. Most of their aluminum cans are made from sheets that are 0.33 mm. thick. These sheets are not much thicker than tinplate sheets used for the same purpose. For the large 900 ml. can (137 mm.), however, the thickness of the sheet is increased to 0.42 mm.

Special Retorts Needed

One of the problems in processing aluminum cans is the prevention of distortion and burst seams. By the use of over-pressure retorts, the Norwegians, however, have found it unnecessary to employ abnormally thick plate. The over-pressure retorts employ air pressure to counter-balance the internal pressure built up in the cans during retorting. By counterbalancing the pressure within the cans, permanent outward distortion of the ends of the cans is prevented and the seams do not open.

Norway is using large quantities of drawn aluminum cans for packing sardines for export. Fish packed include kippered herring, cod liver paste, shrimp, crabmeat and spiced products like "gaffelbiter."

Some drawn cans are being used in the U. S. for packing sardines and tuna, although the quantity is small in comparison to the tinplate pack.

One difficulty, seaming, was not encountered in the processing of food packed in aluminum cans, since standard seaming equipment can be used. The seaming rolls, however, are changed because of the difference in thickness between aluminum and tinplate cans.

Extruded Containers

Extruded aluminum tubes (collapsible tubes) are used in Europe and America. Those used in the U. S. are the smaller diameter tubes, since the larger ones are too costly. Although dies are available for larger diameter tubes, there is little demand for tubes over 2½ in. in diameter.

Practically no container manufacturer has, or is likely to install, the expensive, high pressure, slow speed extrusion machines to make large diameter extruded cans. This proved the case with baby foods, which were test packed in aluminum. The cost was prohibitive, however, and the practice was discontinued.

Recently a new method of extruding large diameter aluminum cans has been developed in Switzerland. This new method of fabrication, called the Keller process, is now being used to make milk containers in that country.

In the U. S., some foods, like anchovy paste, are packed in collapsible aluminum tubes. It is quite likely that other paste-like products, such as peanut butter, jams, salad dressing, mayonnaise and many others may be put up in these tubes in the future.

Norway also makes little use of collapsible aluminum tubes for food. In this direction, however, Sweden is making extensive use of these tubes for such foods as anchovy, roe and caviar pastes.

TABLE I—Comparison of Cost per Thousand of Aluminum and Tinplate Cans in Norway

Type of cans	Aluminum cans	Tinplate cans
¼ dingley	109.50 kr.[1]	99.00 kr.
¼ oblong	110.00 kr.	106.50 kr.
½ oval	160.00[2] kr.	155.50 kr.
78x31 mm.	112.00 kr.	106.00 kr.
90x45 mm.	148.00 kr.	132.00 kr.

[1]A krone is equal to about $0.20 in U. S. currency.
[2]2½ oblong can.

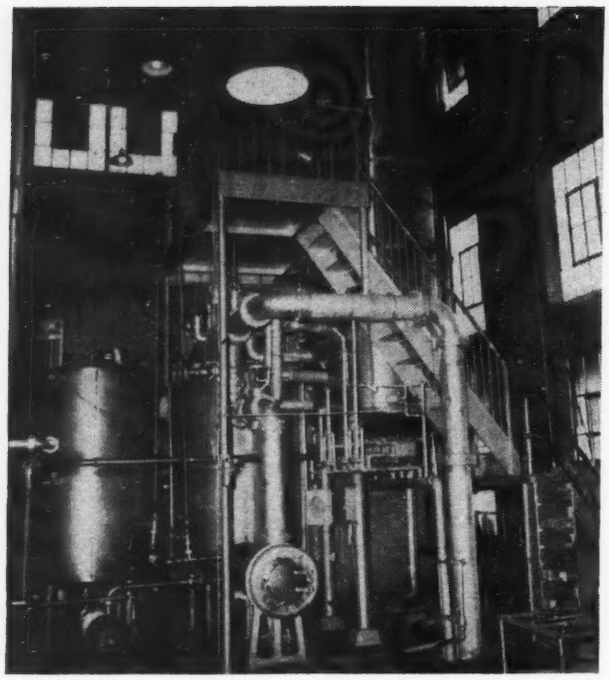
Treating Aluminum Cans

Distinct from the problem of fabricating is the question of coating the aluminum containers. Plain aluminum cans are unsatisfactory for certain foods. The cans corrode when they are used for many processed fruits, vegetables, meats, fish products with acid sauces and wet products containing salt or other electrolytes. If aluminum is to be used for these products, the cans must be anodized and/or lacquered. It is preferable to apply either of these treatments after the cans are fabricated.

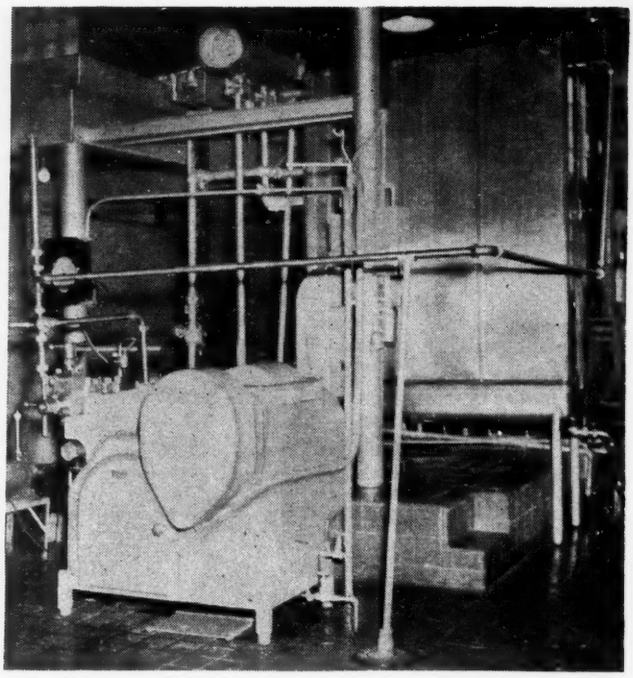
The Norwegians have had successful results in using aluminum cans sprayed with lacquer after fabrication. They did, however, find this method expensive.

They have been able to improve the method of anodizing aluminum. Formerly the batch method was used for anodizing cans after drawing. Now, a continuous process for anodizing aluminum sheet before the cans are drawn has been developed by A/S Nordisk Aluminium industri, Oslo, Norway.

(*Continued on page* 228)



1. MILK PRODUCTS, stabilizer and sugar are mixed in the vertical tanks (left), preheated in tubular heater (center) and partially concentrated in vacuum pan (right).



2. PARTIALLY CONCENTRATED MIX is homogenized, cooled in cabinet cooler (center) and pumped to storage tanks for restandardization before final concentration.

Powdered Ice Cream Mix

Milk products, sugar and stabilizer are made into ice cream mix, then concentrated and spray dried. Dried mix is gas packed in metal cans

By W. J. CORBETT, Laboratory Director, Dean Milk Co., Rockford, Ill.

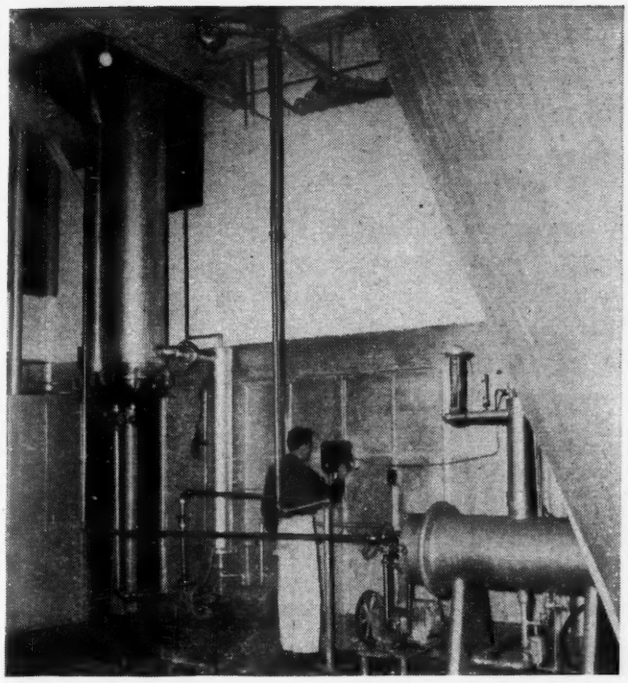
POSITIVE control over its quality characterizes the Dean Milk Co. powdered ice cream mix spray-dried in its Rockford, Ill., plant. This control continues from the selection and blending of the ingredient materials to the packing of the finished product.

It is a progressive control in the sense that newly-developed and more specific methods and practices are adopted as their details are worked out in the laboratory, tested in the experimental pilot plant and adjusted to commercial plant operations. These control studies include: (a) Ingredients such as combinations of whole milk, cream, butter and butter oil as sources of fat, antioxidants to stabilize flavor and carbohydrates as sweeteners; (b) processing practices, such as preheating, pasteurization, condensing, homogenization and cooling; (c) metal contamination to determine tolerances, including methods to determine ways and means of staying within the tolerances set; (d) drying methods and practices, including spray pressures, relation of drying practices to packing densities, to rate of production and to keeping quality and flavor; and (e) powder packaging including relation of oxygen content to keeping quality and flavor, types of containers including foil laminated flexible containers and locked seam metal containers.

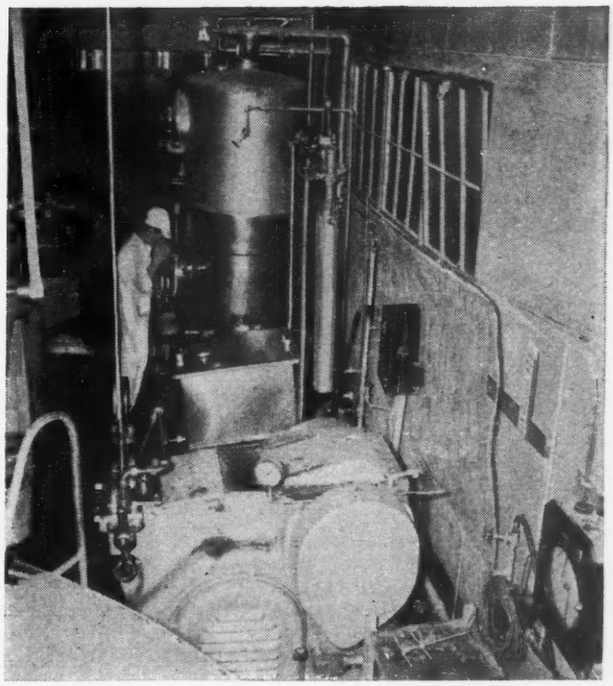
Prior to World War II, powdered ice cream mixes were insignificant in production volume and questionable in quality. Those being made consisted largely, if not wholly, of individually dried basic materials mixed and, in some cases, ground together. The result was a finished ice cream of poor or objectionable flavor and inferior body and texture. Under stimulus of demand from the Armed Forces, the Q. M. C. Subsistence Research and Development Laboratories drew up specifications for an improved product and encouraged expansion of powdered ice cream production. For this reason, the Dean Milk Co. installed an experimental or pilot plant with a capacity of about 75 lb. per hr. and spent several months in intensive research.

On the basis of these experimental studies and the Q. M. C. specifications, the building and equipping of an all-stainless-steel plant was begun in 1944. All equipment was designed for ease of disassembly and cleaning and for avoiding clogging of powder as carried through the drier in currents of heated air. Details of design of the drier were worked out in collaboration with the Mojonnier Bros. Co.

In its completed form, Q. M. C. specifications for 10 percent fat ice cream mix powder includes whole milk, cream, sugar, stabilizer and flavor to consist of not less than



3. **STANDARDIZED MIX** is heated in tubular heater (right) before entering high-density evaporator. Concentrated mix is pumped from bottom of evaporator (left) to balance tank.

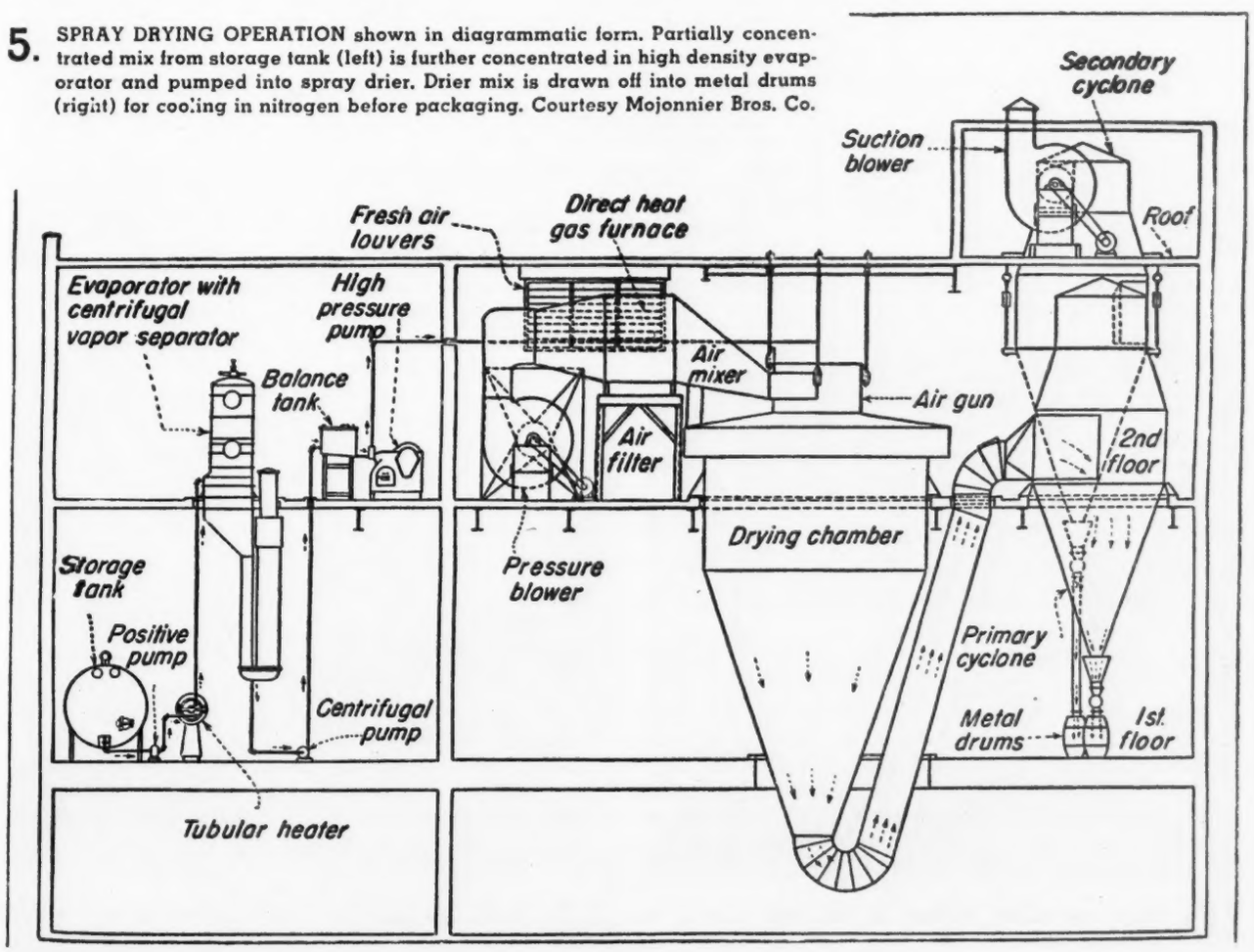


4. **BALANCE TANK** (center) receives mix from concentrator (rear) and supplies high pressure pump (front) which forces mix into spray drier (left) at 3,000 to 5,000 psi.

54.5 percent milk solids, not less than 96 percent total solids and not more than 1 percent stabilizer. Its total fat content is not less than 27 percent, protein not less than 11.75, moisture not more than 2.25 percent and standard bacterial plate count not more than 50,000 per gram. To make into a mix for freezing, 4¼ lb. of the powder is reconstituted with 7 pints of water.

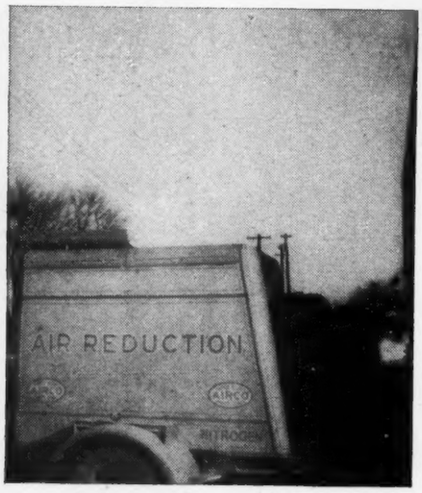
The drying and packaging capacity of the plant as shown in the accompanying illustrations is approximately 10,000 lb. powder per 8-hr.

5. SPRAY DRYING OPERATION shown in diagrammatic form. Partially concentrated mix from storage tank (left) is further concentrated in high density evaporator and pumped into spray drier. Drier mix is drawn off into metal drums (right) for cooling in nitrogen before packaging. Courtesy Mojonnier Bros. Co.

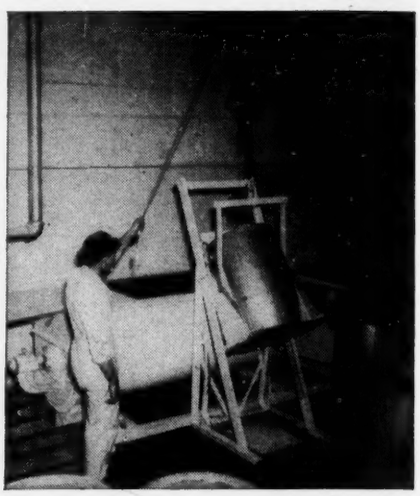


After Drying the Mix Is Stored and Packed in an Inert Atmosphere

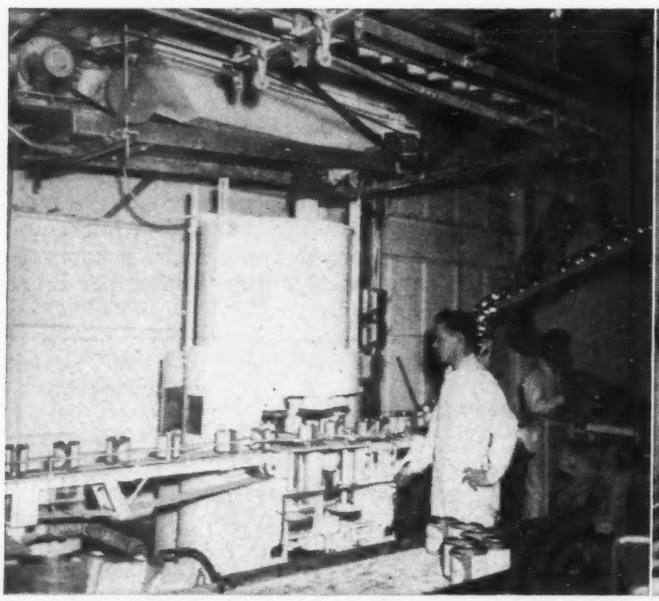
6. **AIR** in filled drums is replaced with nitrogen to retard oxidation.

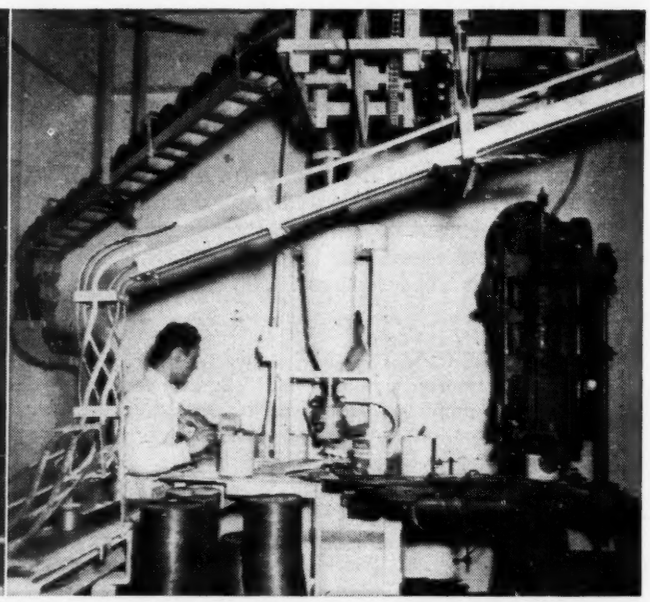


7. **NITROGEN** for gas packing is supplied in special trailers.

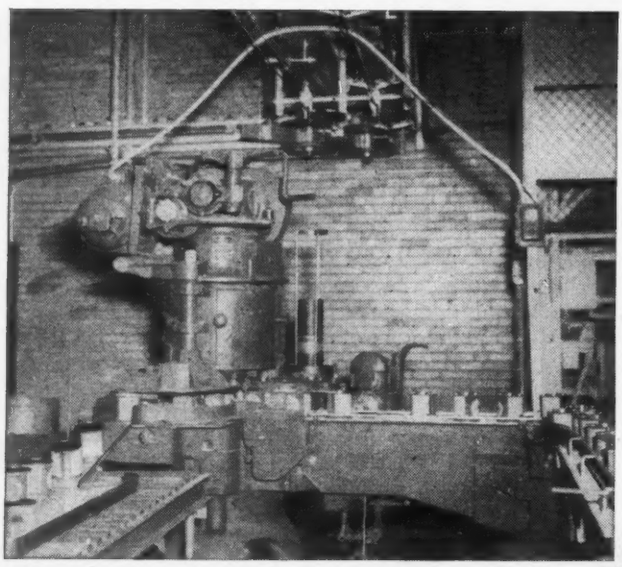


8. **ADDITIONAL SUGAR** and flavor are mixed with the powdered mix.

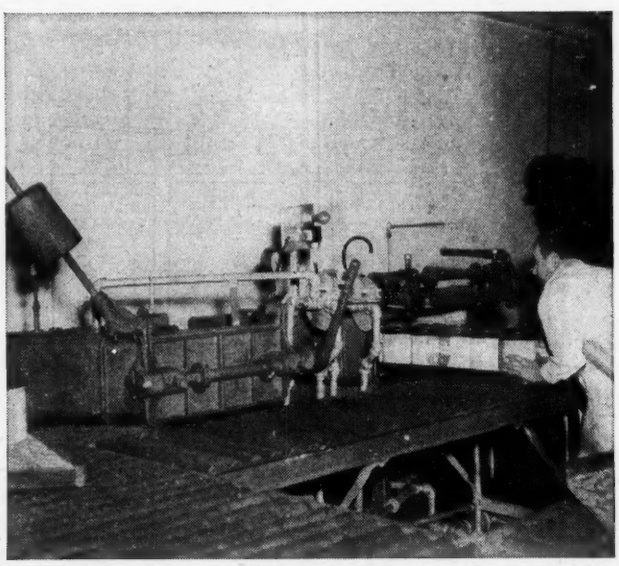




9. **FILLING.** Powdered mix from the horizontal mixer, is filled into lithographed metal containers by an automatic 8-head vacuum unit (left). For small runs, and as a supplementary filler, a semi-automatic, single-head, combination vacuum-auger filler is used.

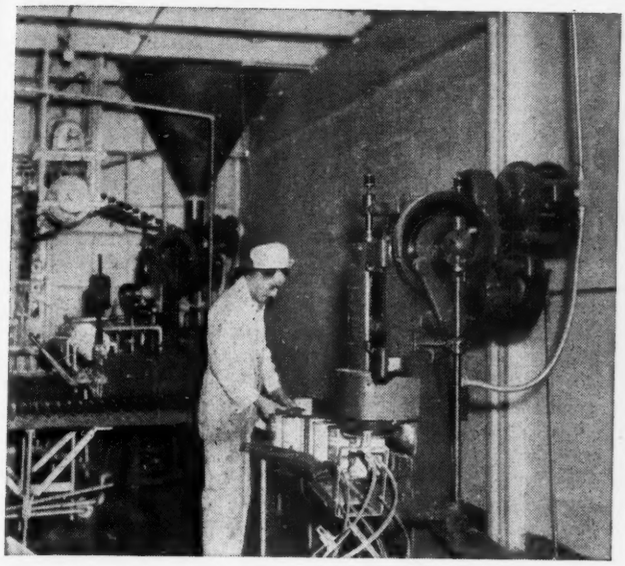


10. **TOPS** are loosely fastened on the filled cans in the clinching machine. Cans are then assembled on trays.

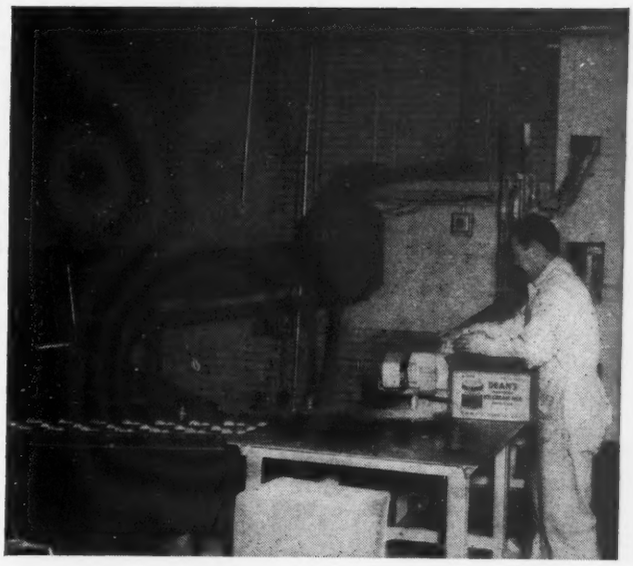


11. **CANS** are slid into vacuum chamber where the air is exhausted and the headspace filled with nitrogen.

Filled Cans Are Encased and Made Ready for Shipment

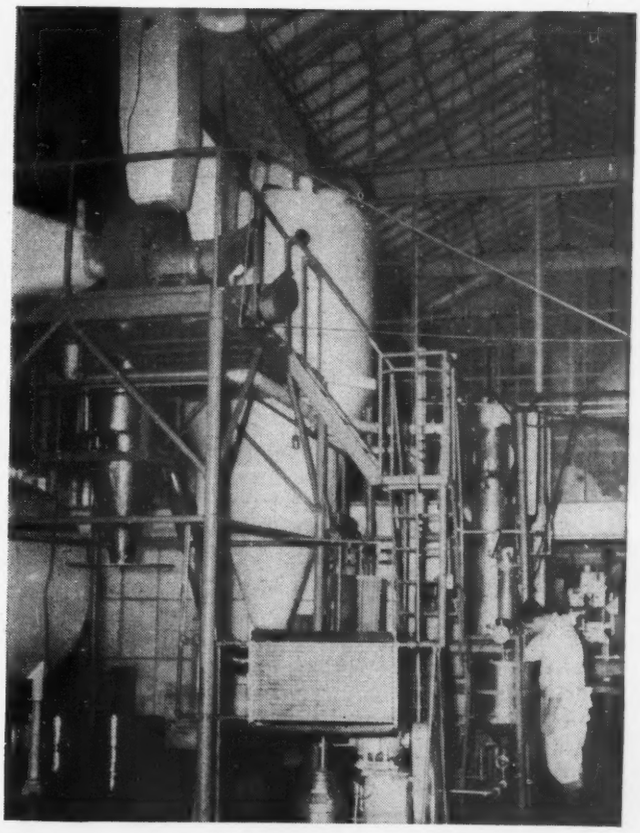


12. UPON leaving gassing chamber, cans are quickly sealed and conveyed to the shipping department for packing.



13. SEALED CANS are packed into corrugated containers, six 4¼ cans per case, and sealed for shipment.

Laboratory Control and Development Insure Quality



14. EACH LOT of mix is accurately tested for butterfat and total solids. Bacterial plate counts are also made.

15. WHIPPING PROPERTIES of each lot of powdered ice cream mix are determined by freezing tests.

16. PILOT PLANT (above), designed for small scale production, is used to test formulas developed in the laboratory.

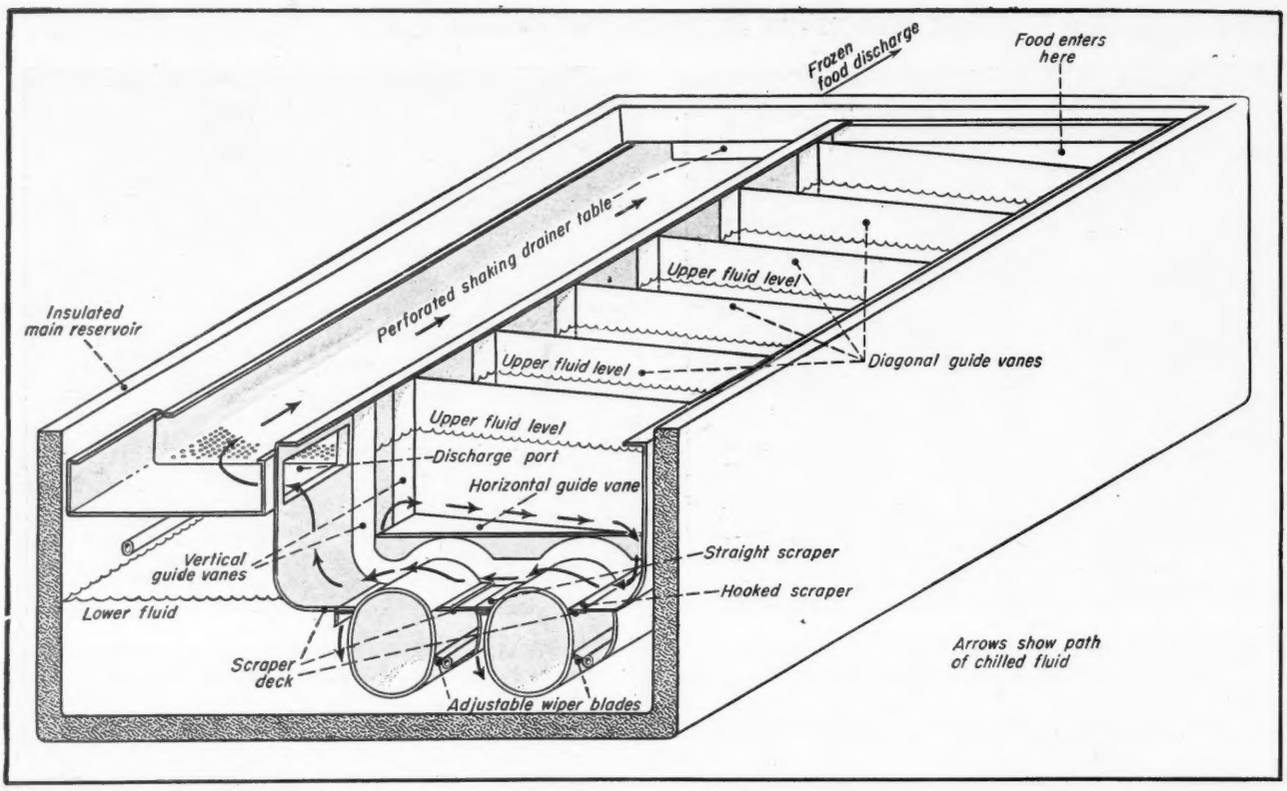


DIAGRAM showing McEvoy Polyphase Two-Drum Unit Freezer. All parts contacting food or medium are stainless steel or nickel alloys

The McEvoy Polyphase Freezer

Immersion freezing with a secondary refrigerant proves practical both in quality and cost. Food particles are frozen individually. Defrosting is easy and quick

By ALICE M. WILSON, Staff Editor, "Food Industries"

POLYPHASE immersion freezing of foods using a secondary refrigerant is now a proven process. It passed its first commercial tests recently in two northwest plants.

While immersion freezing has long been regarded a potentially ideal method, previous engineering efforts fell short of requirements as to economy and quality. These shortcomings are said to be now overcome in the new polyphase immersion freezer developed by Dr. Luis Bartlett at the University of Texas. Freezing units made by the McEvoy Co. of Houston, are reported especially successful for the processing of peas.

Chief feature of the freezer is a 165 sq. ft. insulated rectangular reservoir sectioned off by guide vanes. Beneath this reservoir are two refrigeration drums that are motor driven and internally refrigerated by direct expansion. There is also a vibrating drainage table.

A polyphase medium consisting of a sugar solution or a combination of sugars and salt is used as a secondary refrigerant. The system is completely filled with the medium so that the drums are submerged and the trough is almost full. This solution of medium is chilled and agitated by the revolving refrigeration drums until a slush of very finely divided ice and cold sirup is made. As the drums revolve, the polyphase fluid circulates. Its flow is directed by the guide vanes in such a way that a distorted helical fluid conduit is formed. Each time the fluid strikes the drum surfaces, wiper and scraper blades remove the chilled medium and ice crystals and force their flow horizontally toward the discharge table.

About 17 tons of fluid is required although the amount varies somewhat with the product being frozen and its temperature when fed to the freezer.

Food to be frozen is conveyed by a feeder belt into one end of the reservoir where it comes into direct contact with the moving fluid. The slow agitation caused by the revolution of the drums moves the food pieces both in respect to the medium and to each other. Thus, heat is rapidly removed and the individual pieces are prevented from freezing to one another. The rate of freezing is so great that wash water or juice adhering to the food surfaces is frozen in place almost instantaneously.

When food in the medium has travelled the full length of the reservoir, it flows through a vaned passage onto the vibrating drainage table. Excess fluid is shaken through the perforations and returned to the circulating system. The frozen food encased in a small bit of iced medium passes off the table into packaging or bulk storage containers. The thin film of

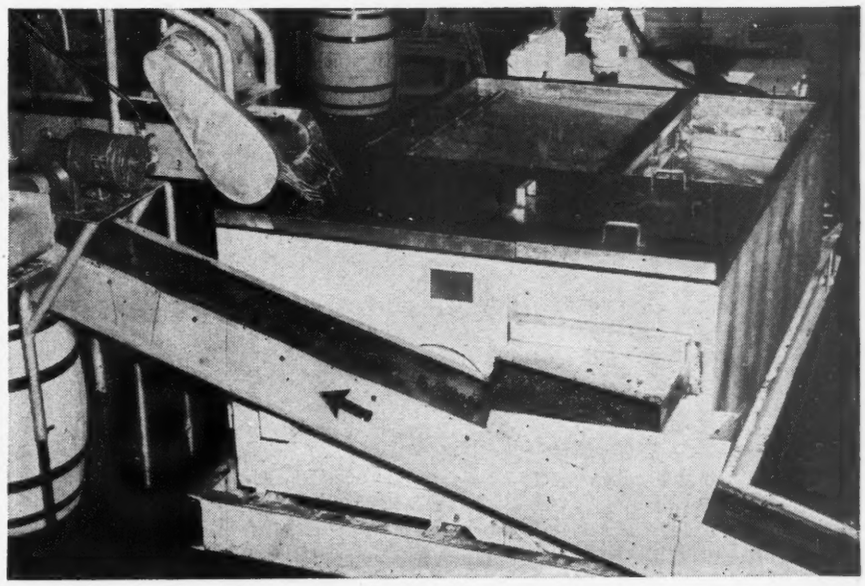
WHY "POLYPHASE"?

Several years of intensive research have preceded the manufacture of the present-day McEvoy Polyphase Freezer.

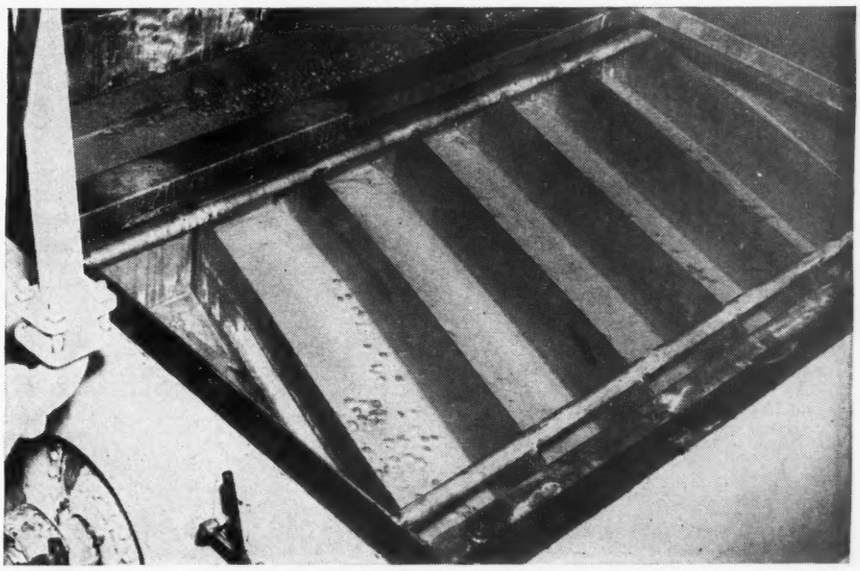
In a two-part article in the December, 1941, and January, 1942, issues of Food Industries, Drs. H. L. Bartlett and W. R. Woolrich—then working on the development of the polyphase process at the University of Texas—wrote:

"An outstanding feature of the new high-viscosity heat-transfer medium is its combination of liquid, solid and gaseous phases at the temperature of its most serviceable freezing capacity, hence the term 'polyphase'. The liquid phase is a viscous chilled solution having the desired freezing range. High viscosity at the operating temperature may be an intrinsic property of the solution or may be imparted by the addition of a suitable colloidal substance. Throughout this chilled solution is distributed the solid phase of the solvent in a finely subdivided form, and other solid phases may also be present. The gaseous phase may be solvent vapor, alone or in admixture with other suitable gases or vapors."

In the September, 1947, issue of Food Industries, in their article "Food Freezers Evaluated," Messrs. Meek and Greene compare liquid immersion freezing with other freezing methods. While the authors estimate only about 5 percent of all freezing is now done by liquid immersion methods, one of the chief conclusions made in their study is that "there will be an increased usage of liquid immersion freezing systems."



GUIDE VANES direct flow of chilled medium carrying blackberries in moving stream toward lower end of machine. Berries flow through discharge port onto shaking drainage table.



FREEZER with four covers removed. Berries entering machine by belt drop into chilled flowing medium through port in cover. Frozen berries are discharging onto inclined belt.

polyphase fluid on the frozen product provides a protective edible coating inhibiting oxidation and dehydration during storage.

Freezing rates vary with the type of food product to be frozen but the salient factor is that in the polyphase freezer the rate is extremely high. A period of minutes or seconds rather than hours or days is required. Many fruits, berries and vegetables are frozen in polyphase media at –2 deg. F. in from 4 to 7 minutes. The more pulpy foods like canteloupes or carrots require 10 to 12 minutes. Small legumes like shelled peas and lima beans need only 90 seconds freezing time.

Cost Minimized

Refrigeration costs are kept at a minimum by the compactness of the insulated area, the low cost, repeated use, high viscosity and heat transfer of the polyphase medium and the automatic control of the whole unit. The total operating cost including power, refrigeration, labor and polyphase medium is from 15 to 40 cents per hundred pounds of product depending on the food to be frozen.

The fast freezing rate and the complete immersion of the food product in the fluid during processing freeze food so that natural flavor, form and color are retained.

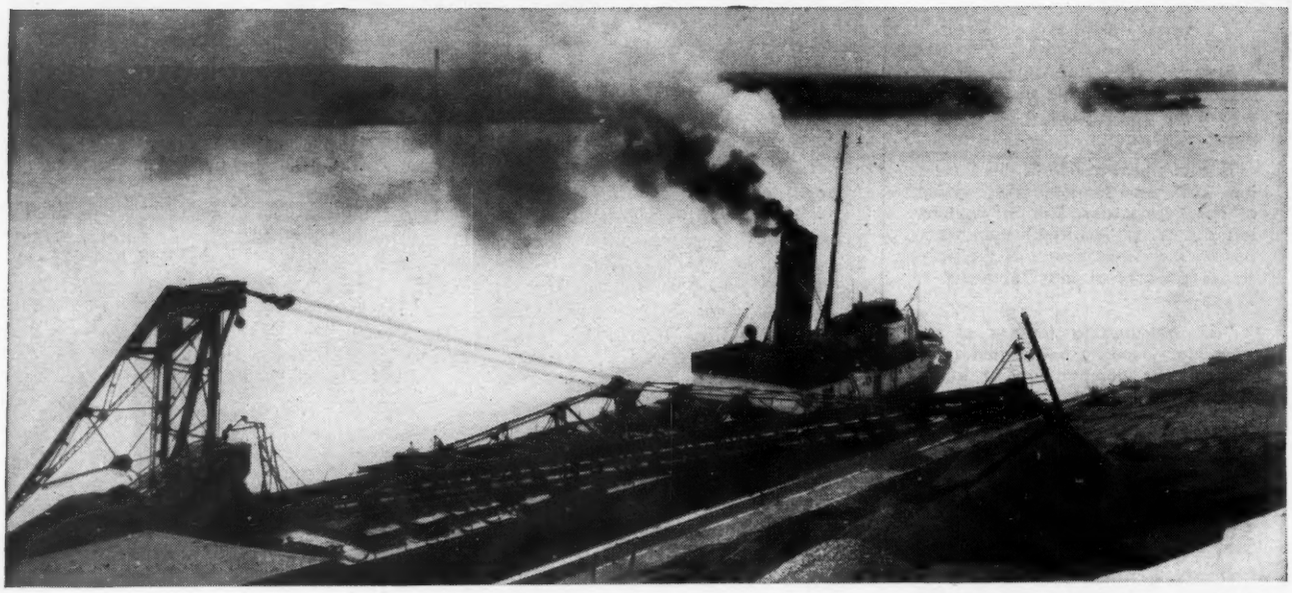
Numerous Advantages

The resulting loose pack with each food particle frozen separately has several advantages for both processor and consumer. Defrosting is easy and quick requiring but a fraction of the time needed for a solid block of the same weight. Too, it is easy to defrost only part of a package leaving remainder of the food in perfect condition until needed.

In the past, two factors have been mentioned as limiting the use of polyphase freezers. One is the possibility of mold contamination of the medium in consequence of its re-use. The other is the addition of a slightly sweet taste to such naturally salt-flavored foods as vegetables and meats.

Evidence that these limitations have been surmounted to a large extent is the report from the two northwest processors on their successful experience with the equipment last season. The two companies reporting favorable results are the M. F. Combs Co. of Puyallup, Wash., and Hudson-Duncan & Co. of Portland, Ore. Both intend to continue its use.

It is understood that plans for regular manufacture of polyphase freezing units will depend on the results of further tests of the pilot units in 1948.



FUEL arrives by boat on the St. Clair River. Over 100,000 tons of coal are used annually, in the 4 boilers, generating approximately 250,000 lbs. of steam per hour to meet plant requirements for heat and power, running generators, pumps and compressors.

Planned Use of Heat Saves Fuel in Salt Plant

Economy in heat consumption is accomplished by one company with a many-sided plant-wide program which begins in the power plant and ends only when the various forms of salt are finally packaged

By FRANK W. McCARTHY, Assistant Editor, "Food Industries"

MAKING the most of a pound of steam is standard practice at Diamond Cyrstal Salt in St. Clair, Michigan. This has been accomplished by a thorough engineering study of the process and its heat and power requirements and the use of a heat balance. In addition, a wage incentive system has been introduced to make the power-plant personnel economy conscious.

In the Diamond Crystal plant three different processes of salt crystallization are used simultaneously with advantages both in heat economy and in meeting customers' varied specifications. By having these three processes under one roof, three crystalline forms of salt can be supplied from the one plant. The heat requirements for the production of the salt crystals have been integrated so that the heat released in the final stages of the major production process is used to satisfy requirements in the second process.

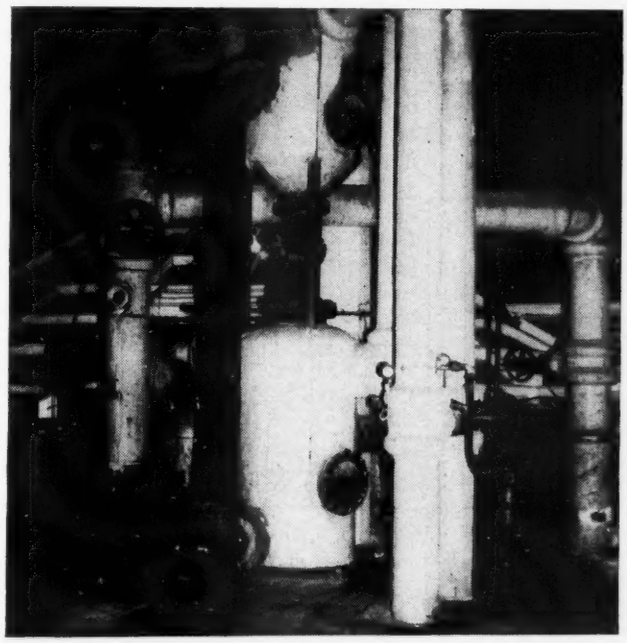
Power Plant

The program begins in the boiler room where approximately 250,000 lbs. of steam per hour is developed in the four boilers. From the boilers, steam at 200 psi pressure is used to run two turbo-generators, various steam-driven brine-circulating pumps and compressors. The total connected load on the two turbines is 2,000 kw. The larger of the two, rated at 1,250 kw., exhausts at 80 psi, the pressure at which steam is supplied to the major processing department.

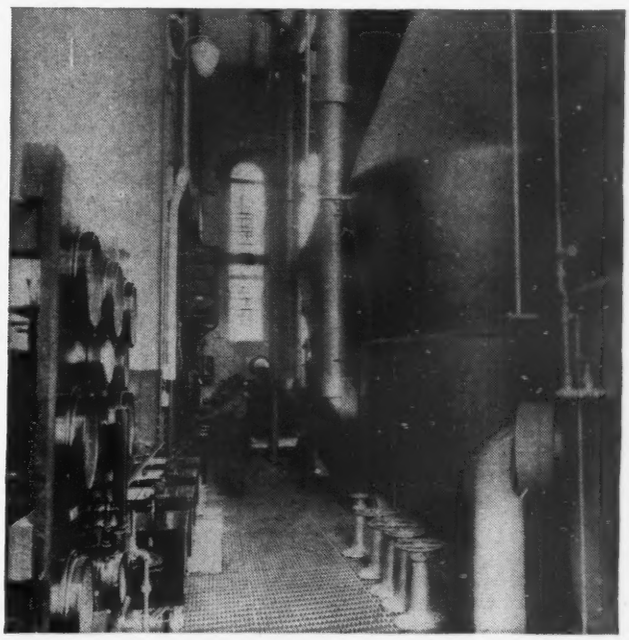
The three salt processes are: (1) The Grainer process, with open evaporating pans, producing a coarse, hard-grain salt: (2) the Alberger process, with closed pressure heaters and flash evaporators, producing salt of the very highest purity, 99.95 percent NaCl, in delicate, fast-dissolving flake-like crystals; (3) the Vacuum Pan process, with closed evaporators, producing granulated salt, hard cubical crystals.

All three processes require heat for the salt production. In addition, all require pumps, driers, elevators, conveyors, and related equipment. The steam demands for the three processes balance the steam exhaust from the turbo-generators, turbine driven pumps, and compressors. With this method of operation, process steam requirements for the development of the salt crystals are satisfied by exhaust steam from some previous use. The final drying of the salt in all three processes requires high temperatures. Heated air for the Grainer process final drying operation is provided by a furnace for this specific purpose. Steam from the

GRAINER system has 6 large open pans, like the one pictured above, heated by submerged steam coils. Crystals of salt form on the surface of the brine, gradually increase in size and sink to the bottom of the pan where they are drawn off continuously.



ALBERGER flash evaporator where purified brine is suddenly cooled. Vapor released in evaporators is returned to heaters.



VACUUM evaporators where brine boils at low temperatures Meters measure vapor pressure, steam consumption and vacuum.

boilers at 200 psi is used for the final drying of the salt from both the Vacuum Pan and Alberger processes.

Grainer Process

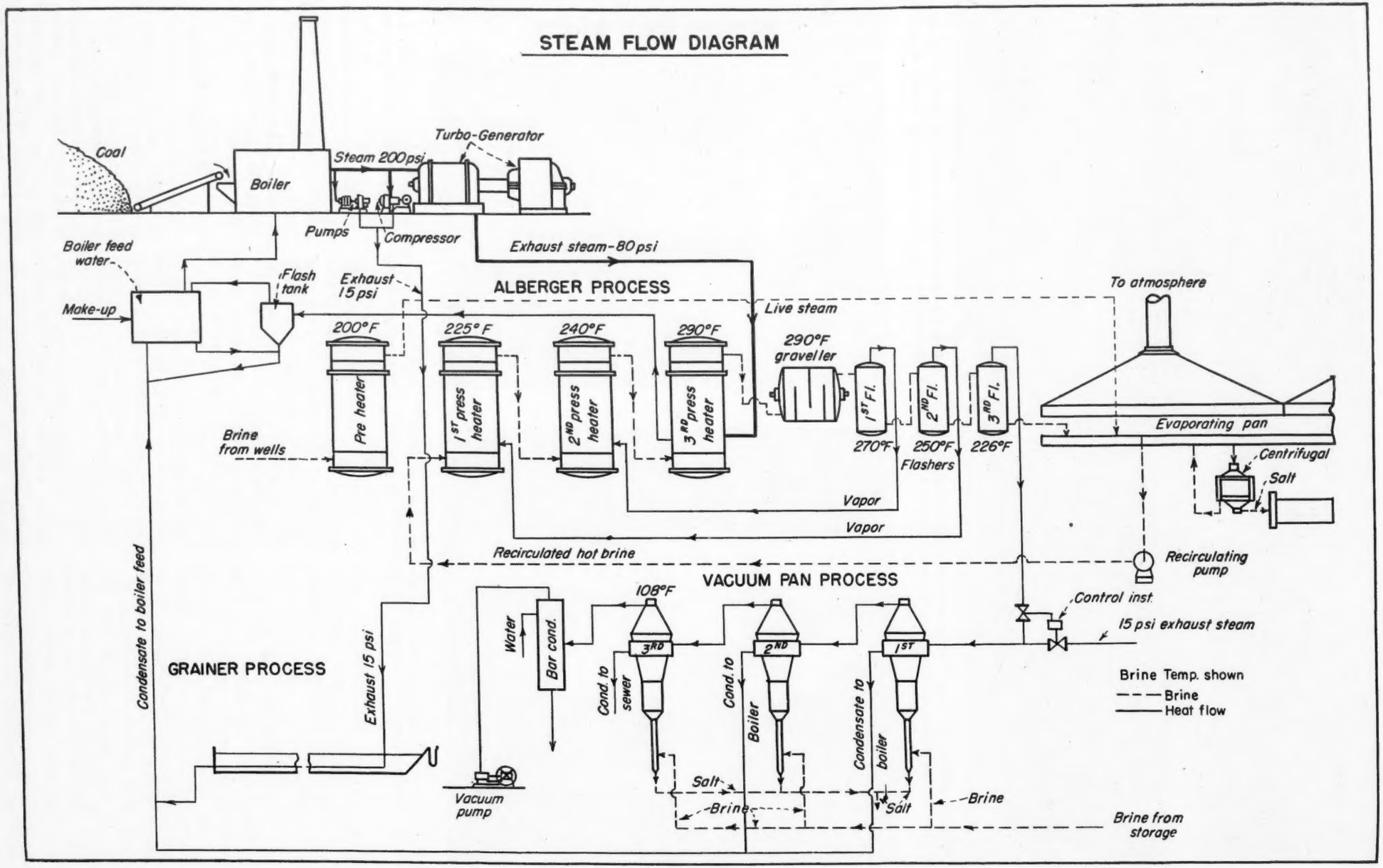
The heat necessary for the Grainer process is supplied by the 15 psi exhaust from steam-driven pulverizers, well pumps, water pumps and compressors. Saturated brine is fed from storage into 6 open pans where it is heated by the 15 psi steam at 250 deg. F., flowing through submerged coils. All condensate is returned to boiler feed for reuse. As the water in the brine solution evaporates, salt crystals are formed on the surface of the liquid. The original crystals are small, but grow and sink to the bottom of the pan. Calcium sulphate also is precipitated in very fine crystals, which are removed from the mixture by washing. The washing operation is done in a launder and a slurry tank by a saturated brine solution. The washed crystals are dried on a continuous rotary filter by air at 700 deg. F. passing over the salt at 4000 cfm. Salt leaves the dryer containing less than 0.10 percent moisture.

The other two processes, the Alberger and the Vacuum Pan processes, together account for over 90 percent of the plant production. The Alberger process produces the highest-quality salt that can be obtained commercially—99.95 percent pure. The Vacuum Pan process, operating at a much lower critical temperature, produces a hard, cubical crystal salt.

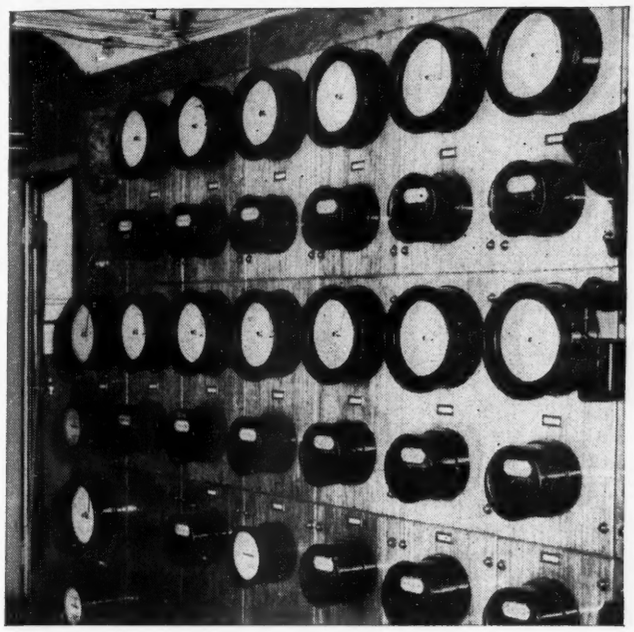
Alberger Process

The Alberger process employs a pre-heater, three pressure heaters, two gravellers, three flash evaporators and an open, figure-eight shaped evaporating pan. In the pressure heaters the brine increases in temperature and pressure but does not boil. In the third pressure heater, the brine reaches 290 deg. F., the temperature at which

In the Salt Processing Lines the Basis of Economy Is the Use of Exhaust Steam And a Heat Balance



Steam Consumption, Power Usage Are Constantly Watched



INSTRUMENTS in power plant engine room show steam flow to all departments. Small meters are integrators, large ones recorders.

INDUSTRIAL trucks have batteries charged in service room. Cool air, directed from above on the battery, speeds operation.

optimum removal of calcium sulphate is effected. The brine is then passed through the gravellers where the calcium sulphate precipitates. The sulphate deposits on cobble stones placed in the unit for the purpose. The purified brine from the gravellers is now cooled in a series of three flashers. The critical crystallizing temperature is reached in the third flasher at 226 deg. F. At this point, about half of the yield of salt crystallizes spontaneously as microscopic cubes. The crystal-seeded brine is ejected into the open evaporating pan, where surface evaporation of the rapidly cooling brine results in the formation of delicate, hopper-shaped, flake-like, fast dissolving crystals. The settled crystals are drawn from the pan and separated from the adhering brine in a basket-type centrifugal, preceding the high temperature drying operation. The drying is completed in a steam-heated, rotary, counter-flow air dryer, which reduces the moisture content of the salt to less than 0.10 percent. Steam from the boilers at 200 psi pressure is used in the dryers, and the condensate returned to the boilers as boiler feed water. The heat requirements for the second and the first pressure heaters are satisfied by vapors returned from the first and second flash evaporators, respectively. These exchanges of heat depend on temperature differentials of as little as 20 deg. F.

The final recovery of steam is from the third flasher, where vapors are again made use of—this time in the feed brine heater and in the Vacuum Pan process. By the use of progressive vapor flow from first to second to third effect, the heat released in the cooling stages is made available for the heating stages of the process.

Vacuum Process

In the Vacuum Pan process, the salt is produced at lower temperatures, owing to the reduced pressure maintained. Because the brine boils vigorously, the salt crystallizes in its natural cubic form, known as "granulated" salt. A ten-foot triple-effect vacuum evaporator is in use in the St. Clair plant. The salt brine is delivered into three evaporator pans.

Brine is admitted into each evaporator leg near the bottom. As the brine rises, it washes the salt crystals which sink to the bottom and are drawn off into a collecting tank. Then the crystals are pumped to a wash tank and from there are dried on a rotary vacuum filter, emerging with a moisture content of 0.05 percent.

Use of Alberger Process Vapors

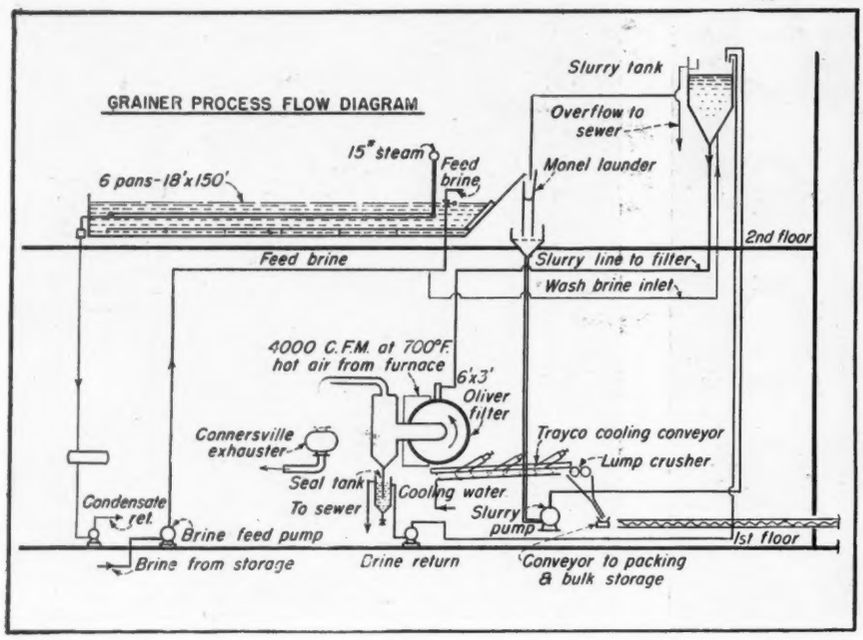
The heat requirements of the Vacuum Pan process are, in large part, satisfied by the vapors from the third flash evaporators in the Alberger process. The vapor flow is progressive through the three vacuum evaporators. The brine enters each pan at the lower end of the leg and the salt leaves at the bottom. The vapors from the Alberger process heat the brine in the first pan. Having heated the brine in the first pan, they are returned to the boilers as boiler-feed water. The vapors developed in the first pan are used to heat the second pan. A conductivity indicator is employed on the condensate leaving the second pan steam chest to determine its suitability for boiler feed water. Since the vacuum is raised in each successive pan, the increasingly cool vapors are still utilized to heat the next pan. If the vapor supply from the Alberger system is not sufficient for the process needs, exhaust steam from the compressors or the smaller turbines is automatically cut in through instrument control. The heat-exhausted vapors from the third evaporating pan leave the system by way of a barometric condenser.

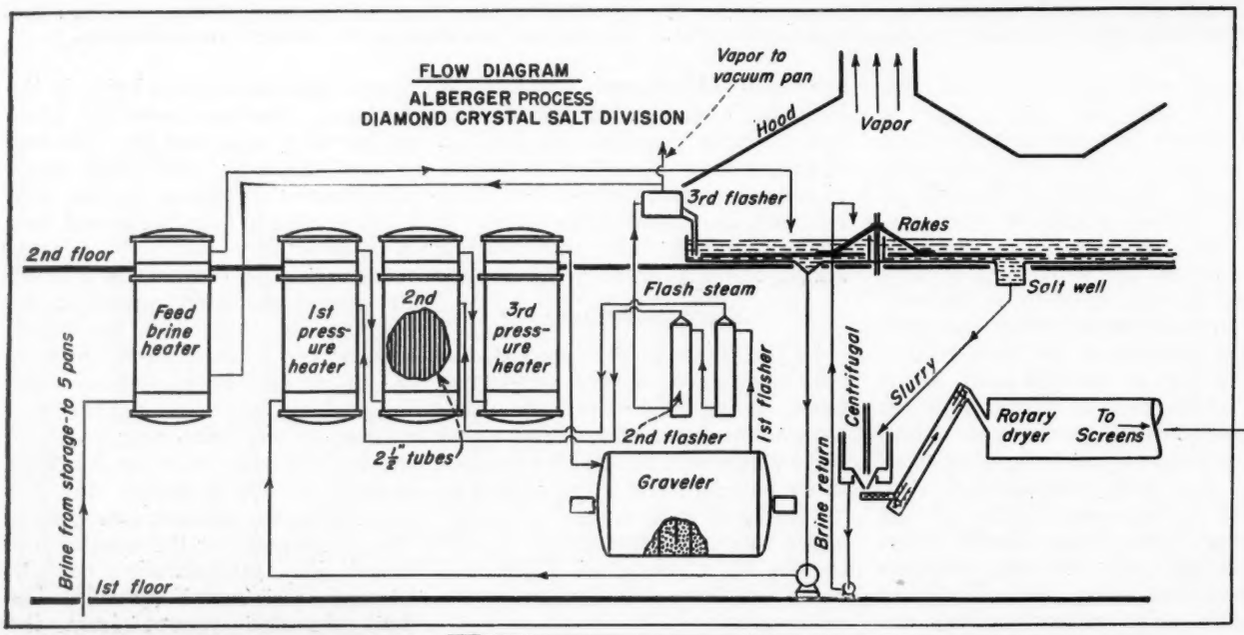
Employee Participation

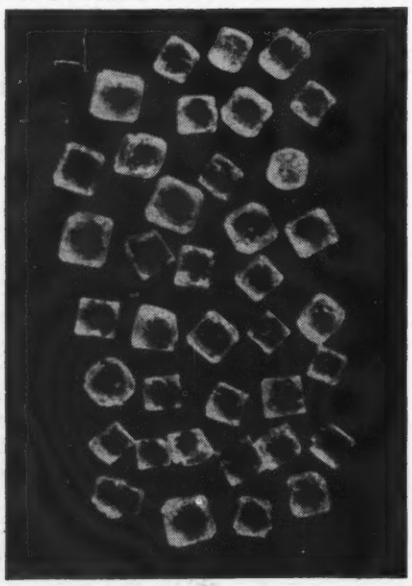
Supplementing its comprehensive engineering, Diamond Crystal has succeeded in winning the support of employees in its heat-economy program. Power-plant employees have been placed on an incentive basis, in which earnings are dependent upon the efficient operation of the equipment. This method of operating is directly beneficial to both the employee and the employer. The incentive plan entails full use of recording, indicating and controlling meters and gages.

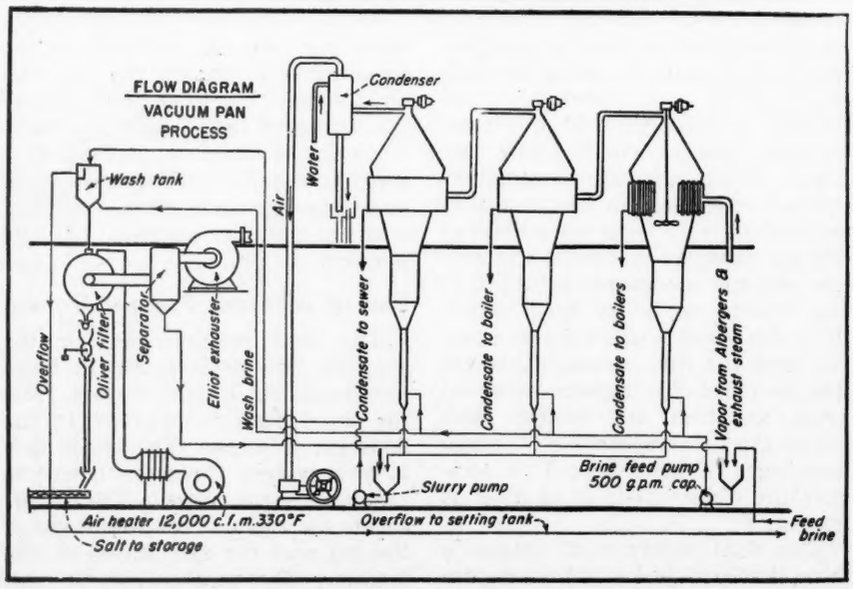
The boiler operator keeps his own score by the records of steam consumption. There are approxi-

Three Process Methods Produce Three Types of Salt Crystals

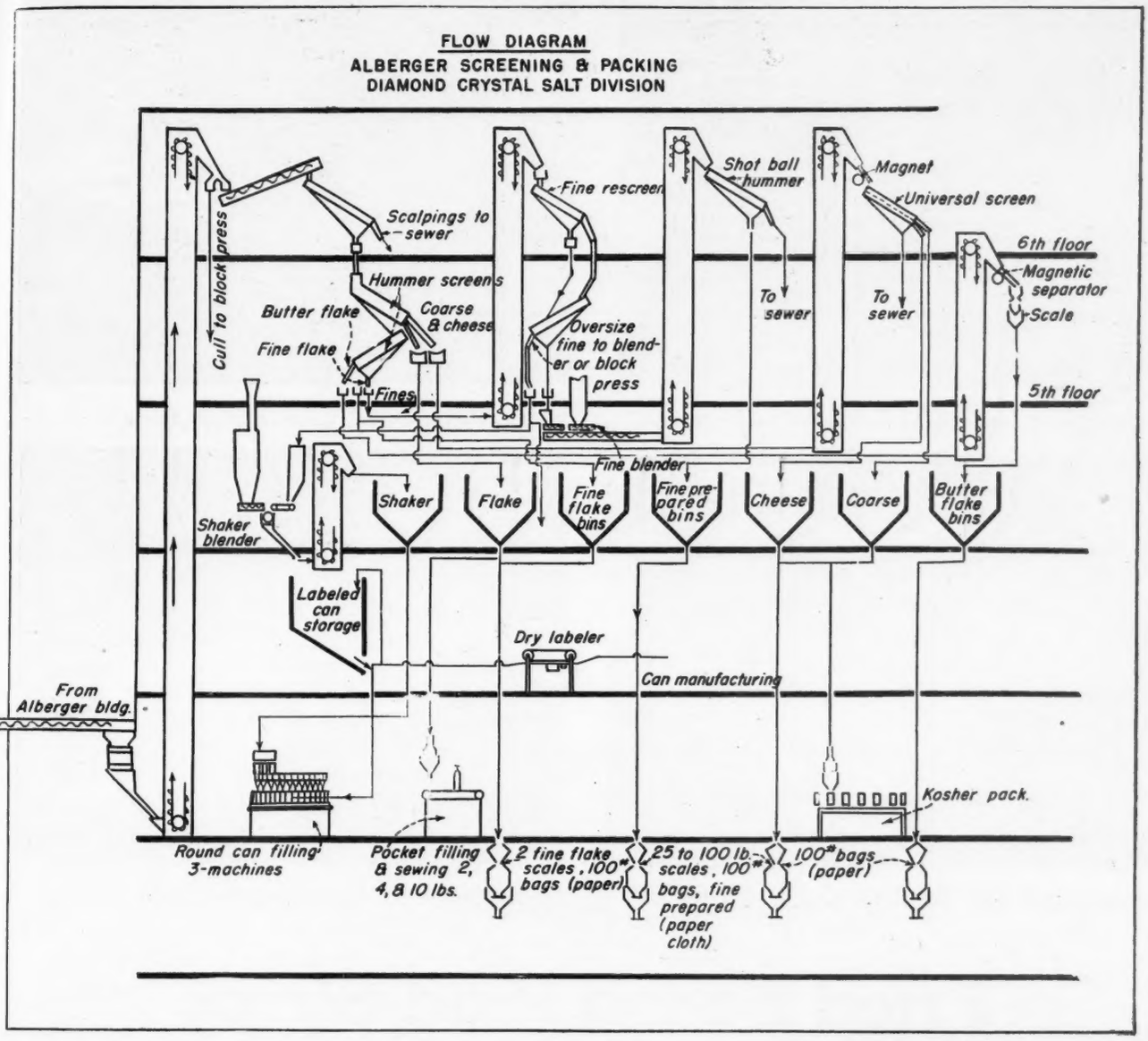








Screening Produces Crystals Sized for Any Specification



mately 50 recording and controlling meters used in the power plant. The boilers are equipped with indicating gages to measure steam and draft pressures, and recording meters for steam flow and air flow; and temperature recorders for flue-gas temperature.

The engine room panel board mounts indicators and recorders for steam flow to all departments in the plant, for electric current usage by all departments, and control mechanism for all power generating and power using equipment.

Industrial Trucks

Continuous 24 hour a day operation is the regular schedule for the three salt production processes. Packaging lines handle this 24-hour production in one 8-hour shift. During the hours that the packaging lines are operating, Diamond Crystal operates a fleet of 28 industrial trucks. At the end of the packaging shift, the trucks are driven to the service room. DC motor generator sets, complete with panel switch board control, develop current necessary for low voltage plant equipment and battery charging.

Battery temperature is kept low and charging time is reduced by the novel system of directing a stream of cool air on the batteries during the charging operation.

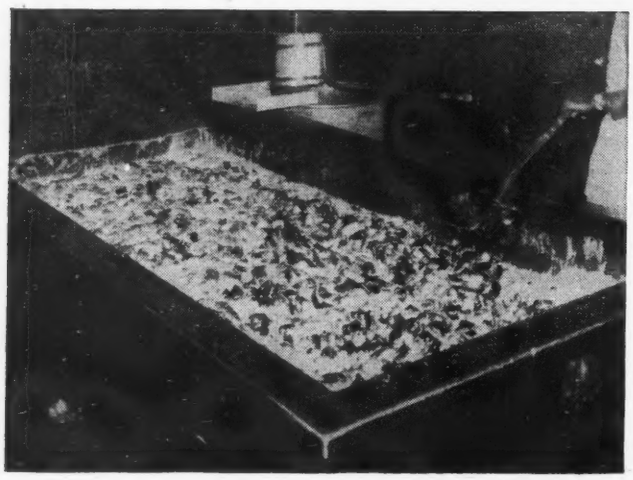
Screening System

A screening system, resembling a flour mill in complexity, is employed in producing salt to meet every specification. Salt from the dryers travels by screw conveyors to continuous-bucket elevators. The elevators lift the salt to the sixth floor of the packaging building. Screw convevors are used to carry the salt from the elevators to the screens. Magnetic separators precede the hoppers feeding the screens

(*Continued on page 222*)

CUTTING cured bacon rinds by machine into 1-in. x 3-in. strips.

BOILING the strips to remove the excess fat and moisture.



FRYING strips to "pop" them to four times their natural size.

DRAINING French fried strips before packing them into bags.

Fried Bacon Rind Strips Win Acceptance in South

Bacon rind is cut into strips, cooked to remove the excess fat and deep fat-fried or "popped" like popcorn to about four times its natural size

PRODUCTION of French fried pork skins, which was started in a small way in 1940 by Filler Products, Inc., Atlanta, Ga., has now reached an annual output of 25,000,000 bags. At present the company operates two plants in Atlanta and one in Miami, and also has affiliated plants in Easton, Pa., and Puerto Rico, all producing fried pork skins.

These skins are "popped" liked popcorn and packaged. They are served like popcorn, potato chips, or the tenderized cracklings which are popular in Harlem. After the skins have been deep fat-fried, they are crisp, light and tasty. They may be used to nibble on during cocktails and also go well with beer. In addition, they can be crumbled and used as a garnish for bean soup and split pea soup.

There are four operations required in making fried strips: (1) Cutting cured bacon rinds into strips, (2) cooking the strips in oil to remove the fat from the rind, (3) frying the strips in deep fat to pop them and (4) draining the French fried strips before packing them in Cellophane bags.

The cured bacon rinds are purchased from large meat packing plants. They are slit in an automatic cutter into strips about 1 in. x 3 in., 2 in. x 3 in., or 2 in. x 2 in. Before the strips are fried, they are boiled in 100-gal. open tanks to remove fat and moisture from the rinds. The tanks are heated with a bank of atmospheric gas burners.

As the bacon rind fat accumulates in these tanks, it is filtered and held for future sale.

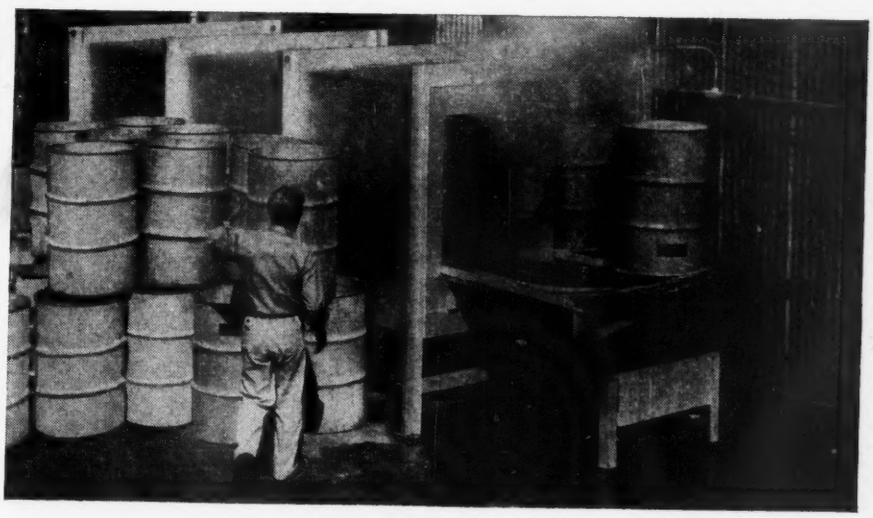
When the "dehydrated" bacon rind strips are cooked for a predetermined period, they become hard, tough and fibrous. The strips are drained and deep fat-fried in a 75-gal. tank, where the cooking fat is kept at 400 deg. F. by means of an automatic control device on the gas immersion tube burners.

Here, in a matter of minutes, the fat-free strips of bacon rind are fried or popped to a golden brown color. They expand to four times their natural size. The French fried strips are drained and then packed by hand into Cellophane bags, which are heat sealed. Packages retail for $0.05 and $0.10. Fried strips are also vacuum-packed in jars for shipment to Puerto Rico.

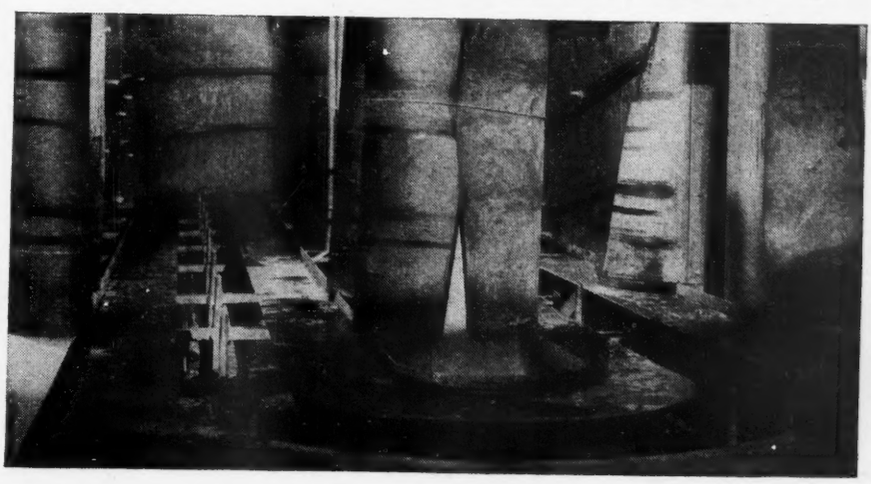
PORK CHIPS are retailed in Cellophane bags. Company also makes corn chips.

Device Cuts Drum Cleaning Costs

Automatic equipment speeds up cleaning from 100 to 300 drums daily



Standard Iron Works, San Diego, Calif., and Oakite Products, Inc., photos



Automatic cleaning equipment is now replacing hand methods to speed the washing of drums and barrels in food plants. This method has already cut cleaning costs about 50 percent and has stepped up production from 100 to 300 drums daily.

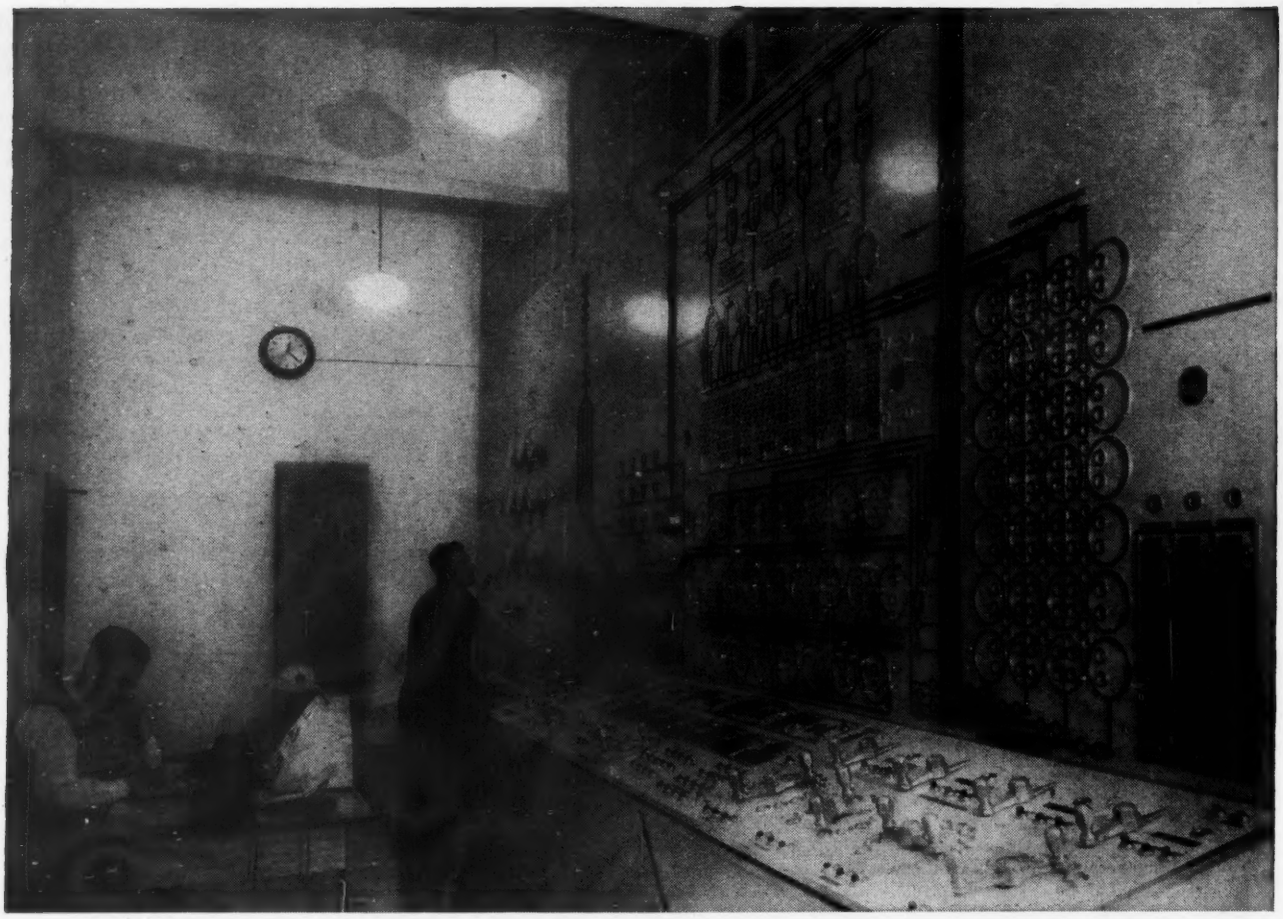
A typical installation is at the American Processing Company's reduction plant in San Diego, Calif., which uses offal from meat plants and fish canneries. Since the 50-gal. open top galvanized drums used for transporting the offal are taken into various departments in meat plants and canneries, they must be washed after each trip and kept clean and odorless.

Previously, one man using a bristle brush could clean 100 drums a day. Now the washing machine (left) triples that figure and does a better job. This device, built by Standard Iron Works, San Diego, Calif., holds 17 drums at a time and cleans four drums a minute.

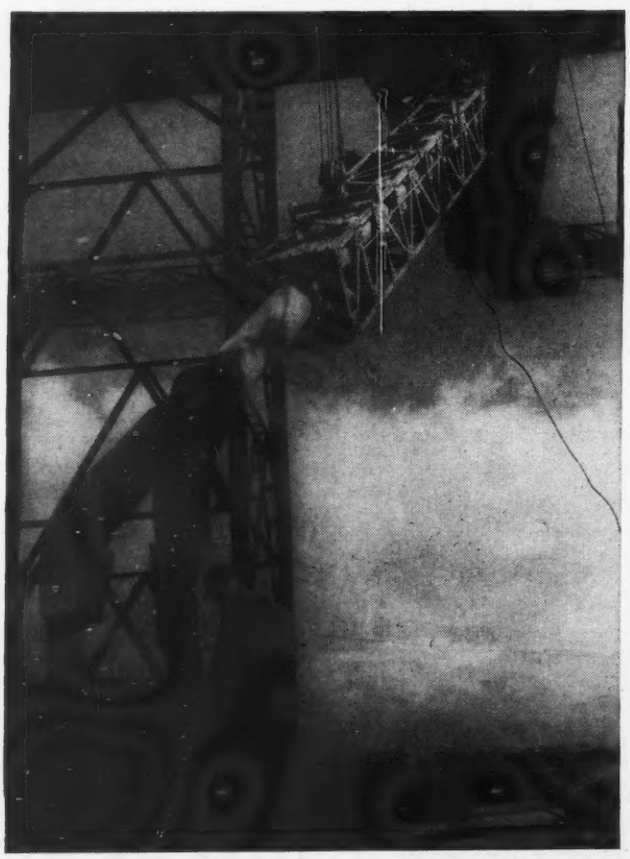
The unit at the American Processing Co. plant is equipped with a 500-gal. solution tank which is charged with a 190 deg. F. solution containing 1¼ oz. of Oakite material per gal. In addition, the unit has two sets of sprays, striking all surfaces of the drum with the hot cleaning solution. One set of sprays is used to clean the interior of the drum. The other is for the exterior. The cleaning solution is distributed by a 20 hp. pump.

The drums are placed in an inverted position on rinsers which extend above the level of the platform. These rinsers then engage the drums and drag them around in the cleaning tank as the chain revolves.

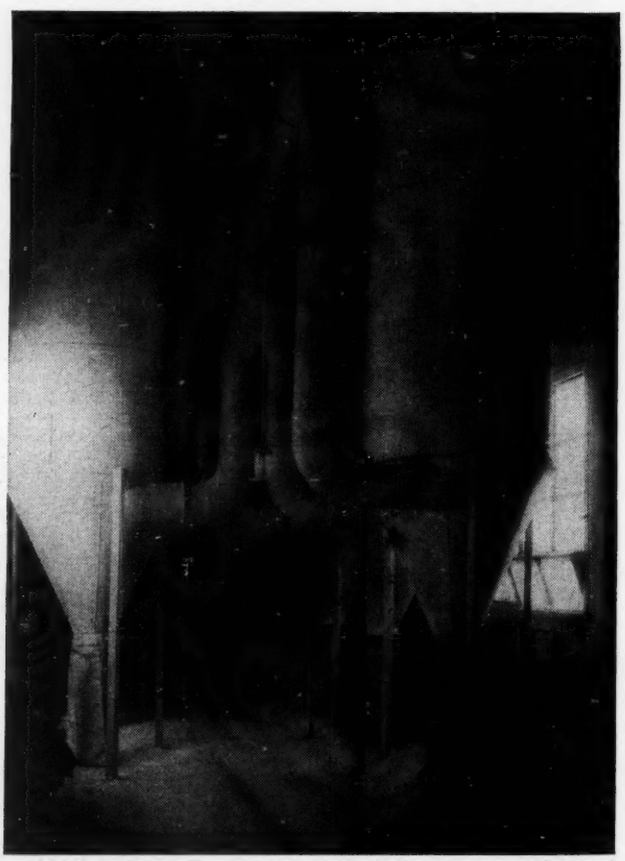
Photograph (top left) is an exterior view of the drum cleaner in operation. Interior view (bottom, left), shows rinsers and sprays.



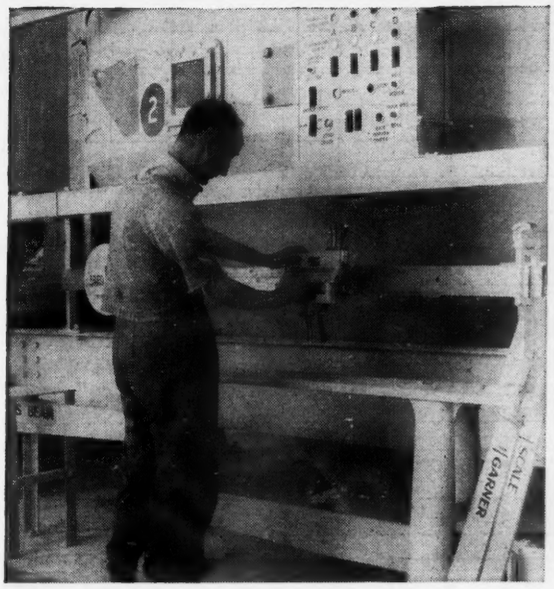
DIRECTION of all the operations at this Australian wheat terminal is under the control of one man functioning at this huge switchboard. Signal lights plot the movement of the wheat on the conveyor belts, while above the board is a layout of the entire terminal.



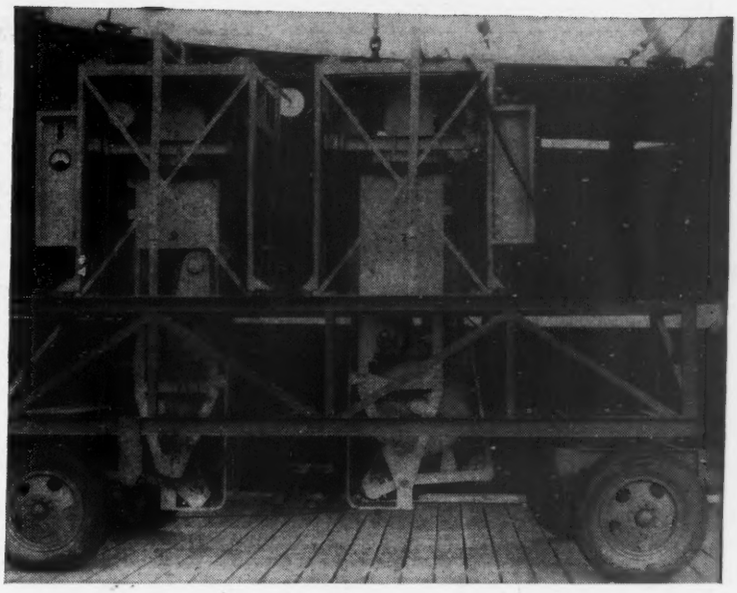
FORKED LOADING CHUTES pour wheat from gallery to ship's hold. Each of the four chutes is connected with a belt tripper.



DUST EXTRACTED from the moving wheat and from terminal floors is drawn from building and emptied into bags in a detached shed.



WEIGHING TOWER, where the wheat is checked in 50 ton lots, is the highest point of the structure.



MECHANICAL TRIMMERS are lowered into the ship's holds, where their whirling belts spread the grain, obviating manual trimming.

Grain Under Control

Movement of the grain in and out of this 4,000,000-bu. Australian wheat terminal is controlled by one man operating a huge central switchboard

Photos: British Combine

WITH its handling facilities completely controlled by one man from a huge indicator and switchboard, the grain terminal at the port of Geelong, in the Australian State of Victoria, is looked upon, in the U. S. and Canada, as a long step forward. The methods of dust extraction at this terminal have also attracted the attention of engineers.

The concrete storage structure at Geelong has 52 bins, each with a capacity of 58,000 bu. and 33 interspaced bins, each holding 16,000 bu. There is also storage for 500,000 bu. in the working house section, making a total of 4,000,000 bu.

Track facilities in the discharging shed permit twelve rail trucks to discharge their load at the receiving point. The wheat is discharged into hoppers below a grid. It is then conveyed to the working house section at the top of the plant, where it is weighed, and run on to a conveyor belt above the storage bins. Three conveyor belts are used above the bins. As the grain reaches its bin, a tripping device precipitates it into storage.

When the grain is taken from storage, four conveyor belts beneath the bins carry it to elevators, which raise it to be weighed and run into the shipping bins. There are four conveyor belts running out through the high shipping gallery which enable 1,600 tons an hour to be loaded into the ship at the pier. Enough grain can be held weighed and ready in the shipping bins to load a complete 8,000 ton cargo immediately. There are facilities at the loading pier for two ships to load simultaneously.

Control Operation

The control man works before a switchboard in the control room with a layout of the whole plant in front of him. On the panel board the rail trucks are indicated by the small triangular shaped figures, equipped with small lights. The various conveyor lines are indicated and equipped with light signals to show when they are being used. The scales, shipping bins, and storage bins are also equipped with indicating signal lights. With this system of signal lights the operator knows when the grain is ready to be conveyed to the weighing tower and when the weighing is finished. By watching the lights he can then see that it is being diverted to the conveyor belt that will carry it to the correct bin. When the grain is to be moved, he can tell from his lights if it is being correctly routed to the shipping bins or other storage bins. They also enable him to "see" the loading of wheat into ships.

The dust extraction method employs suction pipes, installed throughout the plant to draw off all the dust from the grain as it moves through on conveyor belts. This is carried from the building to a detached shed. The dust is collected in bags in the detached shed and processed into feed cake for stock.

An innovation at the loading pier is a trimming device that distributes the cargo evenly in the holds. Wheat is loaded through funnels into the trimmers, which are lowered into the holds. Whirling belts spread the grain evenly, making it unnecessary for stevedores to enter the holds to trim the cargo.

The Geelong terminal represents an investment of £500,000 by the Victorian Grain Elevators Board. It was designed by the board's own engineers.

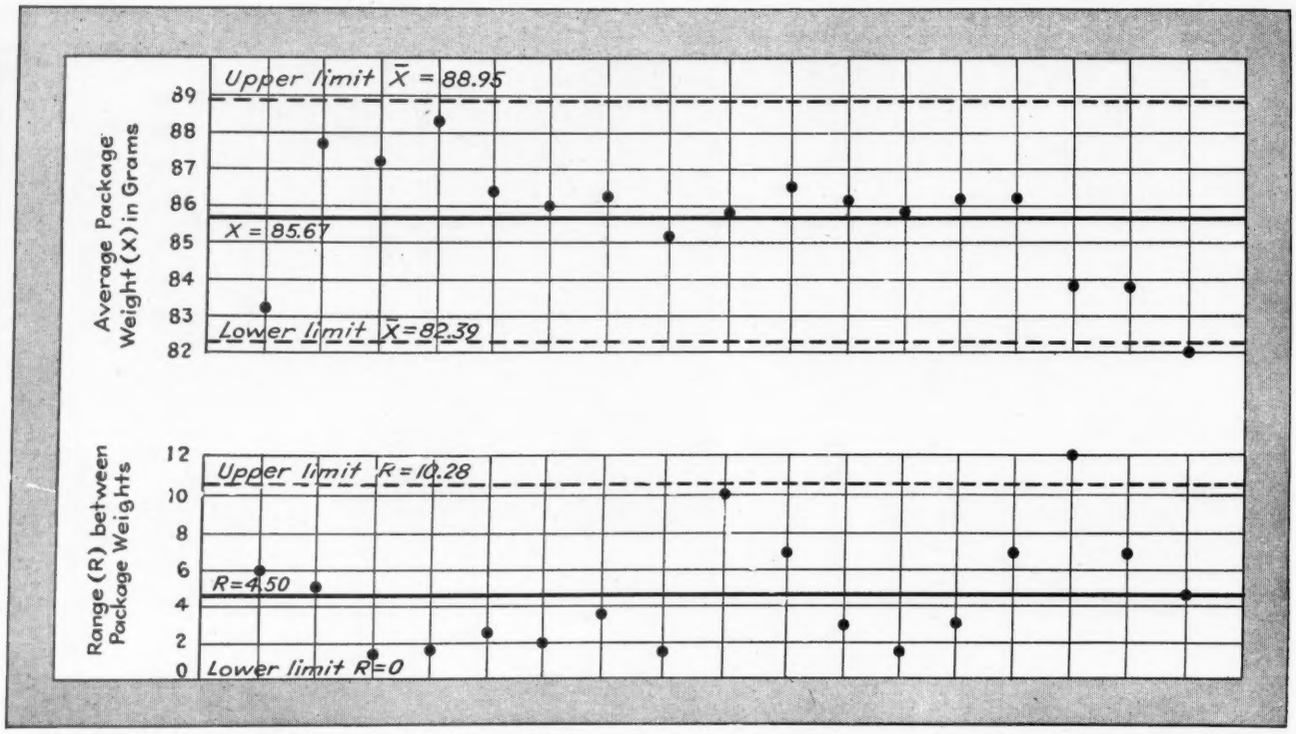


FIG. 1. ANALYSIS OF DATA by control chart method for determination of conditions existing on the package filling line. For greater convenience of calculation, weighings were made in grams. The above is characteristic of the charts which resulted.

Weight Control In Packaging Gelatin Desserts

Program of check weighing packages to determine malfunctioning of machines results in substantial saving by eliminating over-fills

By KEITH A. FITCH*

SAVINGS of nearly $20,000 per month have been made by establishing a method of package weight control in a gelatin dessert plant. The weight control was undertaken for the purpose of minimizing losses, thought due to overfilling.

Certain losses in the gelatin manufacturing operation could be accounted for accurately. Beyond these, there was a loss amounting to $20,000 per month. It had to be assumed that this resulted from the over-filling of packages beyond the stated net weight.

By legal definition, the statement of net weight shown on a package means the average net weight, unless otherwise indicated in the statement. Variations from this weight must not be excessive, and the number of packages in the lot falling below that weight must be no more than the number exceeding it. From the standpoint of the housewife, the statement of net weight is of secondary importance in the case of a product such as gelatin dessert. She is more concerned with the number of servings which will result from following the recipe. She is concerned also with flavor and setting qualities, factors which depend upon adherence to standard weights.

Thus the problem in this case became one of assuring the proper average fill-of-container and controlling variations. This was a problem susceptible to the statistical quality control methods developed by Shewhart[1] and others. The first step in its solution was the determination of conditions actually existing. Over a period of two days, at half-hour intervals, samples consisting of four consecutive packages each were collected from each machine. The net weight of each package and the average net weight (X) of each sample of four packages were determined. Also, the difference in weight (R) between the heaviest and the lightest package was noted. The data thus collected were analyzed by the control chart method to determine the state of control existing at the time of the study. Figure 1 is characteristic of the charts which resulted. For greater convenience of calculation, weighings were made in grams.

The next step involved the establishment of control limits to be used for future operations. The vol-

*Present address—151 Marina Blvd., San Francisco. Formerly with the U. S. Food and Drug Administration.

umetric machine used in the filling operation was designed with an expected accuracy of fill of ±1/16 ounce for certain types of material. The expected accuracy for gelatin dessert is not this high because of physical characteristics involved. In addition to variations inherent in individual machines, other variations are introduced in accordance with the skill and attentiveness of machine operators.

Control Limits

The desired net weight was 3 ounces or 85.05 grams. Comparison of the control charts developed on the performance of all machines indicated that the following controls and limits could be established:

X′ (desired net weight)..85.05 grams
Upper Limit of X.....89.05 grams
Lower Limit of X.....81.05 grams
Average Range (R')..... 5.49 grams
Upper Limit of R.....12.53 grams

Control charts were drawn up using these limits, and a procedure was established wherein samples of four consecutive packages were collected at seventy-five-minute intervals and weighed individually. Just as in the initial study, the four individual weights were added and, from a chart provided, the inspector determined the average ($\overline{X}$) represented by this sum. She also computed the range between the highest and the lowest reading. Both ($\overline{X}$) and R were recorded on chart. When these were found to fall outside the established limits, the inspector went to the individual machine to make correction. There she followed the same procedure of checking which machine operators were required to employ at fifteen-minute intervals. Twelve consecutive packages were removed from the machine and weighed. They were separated into groups comprising those underweight, those correct, and those overweight. If the results of this check definitely confirmed that the average of the packages weighed was more than ⅛ ounce underweight or overweight, the inspector instructed the operator to make correction. If the evidence from the first twelve was inconclusive, another group of twelve packages was weighed in the same manner.

Program Effective

With the inauguration of this program, a reduction in losses of product was immediately apparent. The study was continued, however, in an effort to save the inspector's time by simplifying calculations. Also, a plan was devised which eliminates the assembly of samples for weighing at a central point. This increases the time actually spent by the inspector at the filling machines. At each machine the inspector weighs twelve consecutive packages. Over-under scales which are calibrated in ⅛ ounce divisions and on which 1/16 ounce variations can be estimated accurately are used. The results are recorded on a form, one element of which is illustrated in Fig. 2. For each sample weighed, a square is checked at the appropriate weight level. When the twelve packages have been weighed, a simple histogram results. From this, the average weight and range can be estimated. To avoid spending time on machines in good control, if the first six packages yield weights within the central line (less than 1/16 ounce over or under 3 ounces), the other six packages are not weighed. The accuracy of machines varies; consequently, the inspector must use a certain amount of discretion in requiring adjustments. In general, the following conditions indicate need of weight adjustment.

1. Average of 12 packages is more than ⅛ ounce over or under 3 ounces;

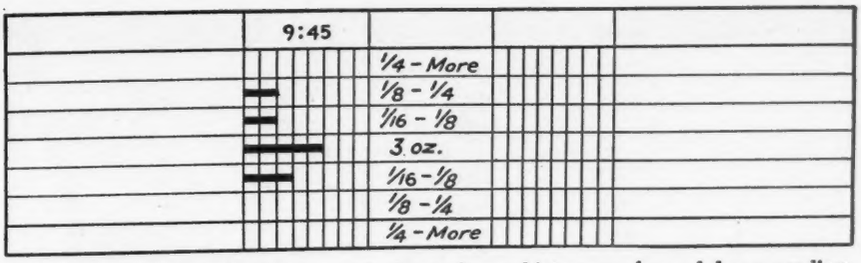


FIG. 2. WEIGHT CONTROL record sheet shows histogram formed by recording weights of 12 packages. Levels above 3 oz. are overweight; below, underweight.

2. Two consecutive averages approach ⅛ ounce over or under 3 ounces; or

3. More than one package in 12 is found to vary from 3 ounces by more than ¼ ounce over or under.

It will be seen that these conditions are much the same as those represented by the control chart limits previously used. Furthermore, the study of the series of histograms for successive periods gives approximately the same information on machinery efficiency and trends as did study of the averages and ranges previously recorded in the control charts. These records are scanned for indications of machine mal-function and are retained for approximately 90 days in the event of a controversy arising over net weight.

Operator Interest

The success of this program is reflected in the interest shown by machine operators in the findings of the inspector. Initially, some machine operators were found to be lax in checking weights. Their attitude has greatly improved; they now appear to pride themselves in avoiding the need of special attention from the inspector. In a number of cases where operators previously tried to escape responsibility by asserting that particular machines were impossible to control, the inspector has been able to secure improvement in their weights by pointing out the accomplishments of others on reputedly-difficult machines.

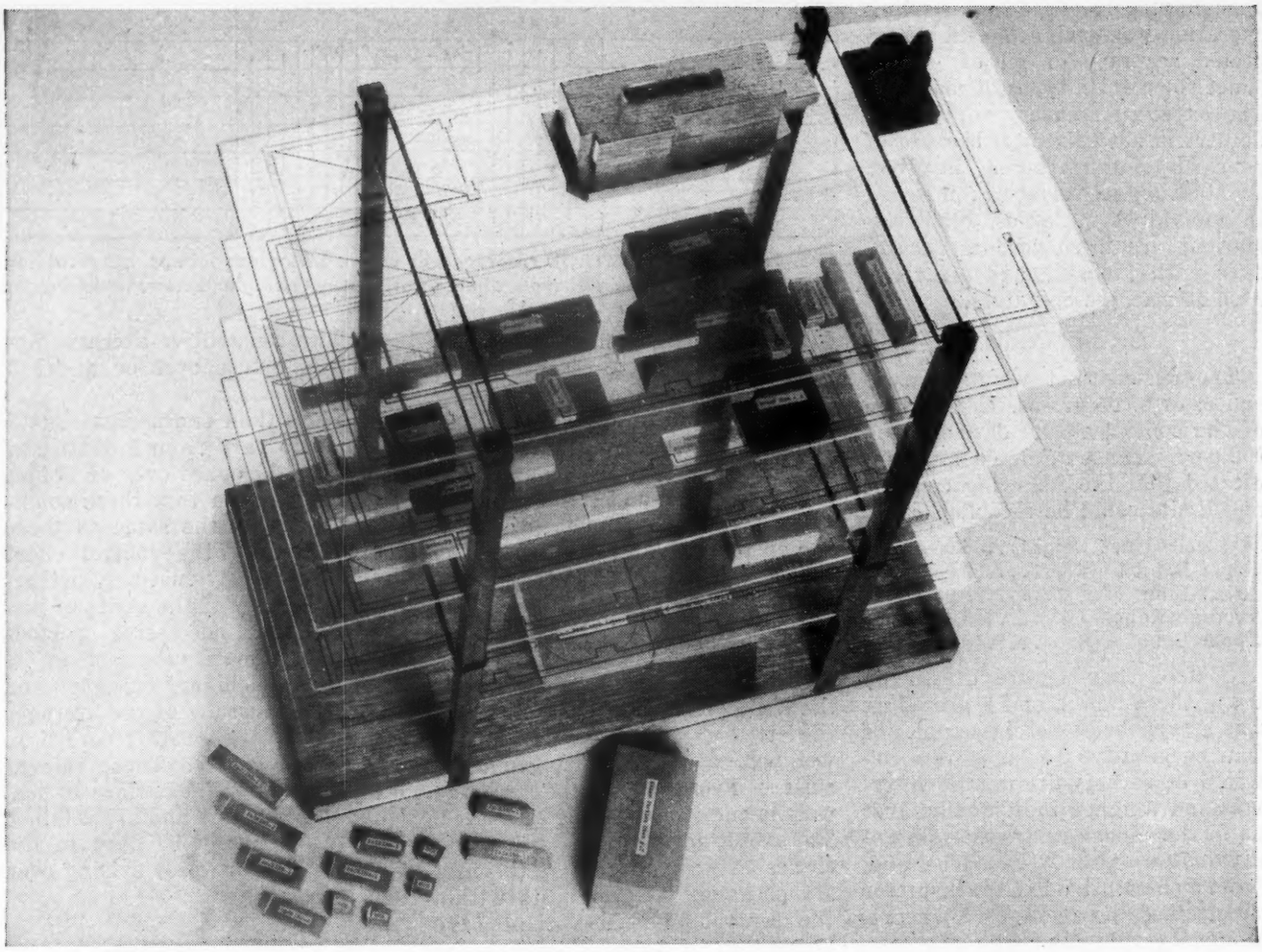
But it is another factor which has done most to convince management that this program works. While records show full average weight on outgoing packages, losses chargeable to over-filling have been reduced from $20,000 monthly to about $500 monthly. That kind of evidence is persuasive.

Statistical Methods

Three articles appearing in previous issues of FOOD INDUSTRIES have discussed statistical analysis and quality control by sampling. "What Constitutes an Adequate Sample," by M. S. Anderson and C. W. Whittaker, FOOD INDUSTRIES, June 1946, deals with the statistics of sampling. "Statistical Control of the Production Process," Part I of a 2-part article by A. M. Mood, August 1946, describes a type of control chart, a graphic method of assuring a net weight package within prescribed tolerances. The chart will show any variations from the average performance of the filling machine. The significance of control limits in this chart is that the sample average weights should fall between the limits. Part II of this article, appearing in September 1946, discusses a type of chart for plotting the results of sampling of a "satisfactory or unsatisfactory" process control.—The Editors.

References

1. W. A. Shewhart, a pioneer and leading authority in the field of statistical quality control. For a brief and uncomplicated treatment of the subject, Examination of Industrial Measurements, by John W. Dudley, Jr., is suggested. (McGraw-Hill Book Co., N. Y., 1946.)



COMPLETE VISUAL presentation is obtained by the use of a transparent plastic model of building and balsa wood models of equipment.

Visualization: New Tool Used In Designing Bakery Layout

Industrial engineer's model of a plant layout, transparent and in three dimensions, provides ready means of determining efficient installation

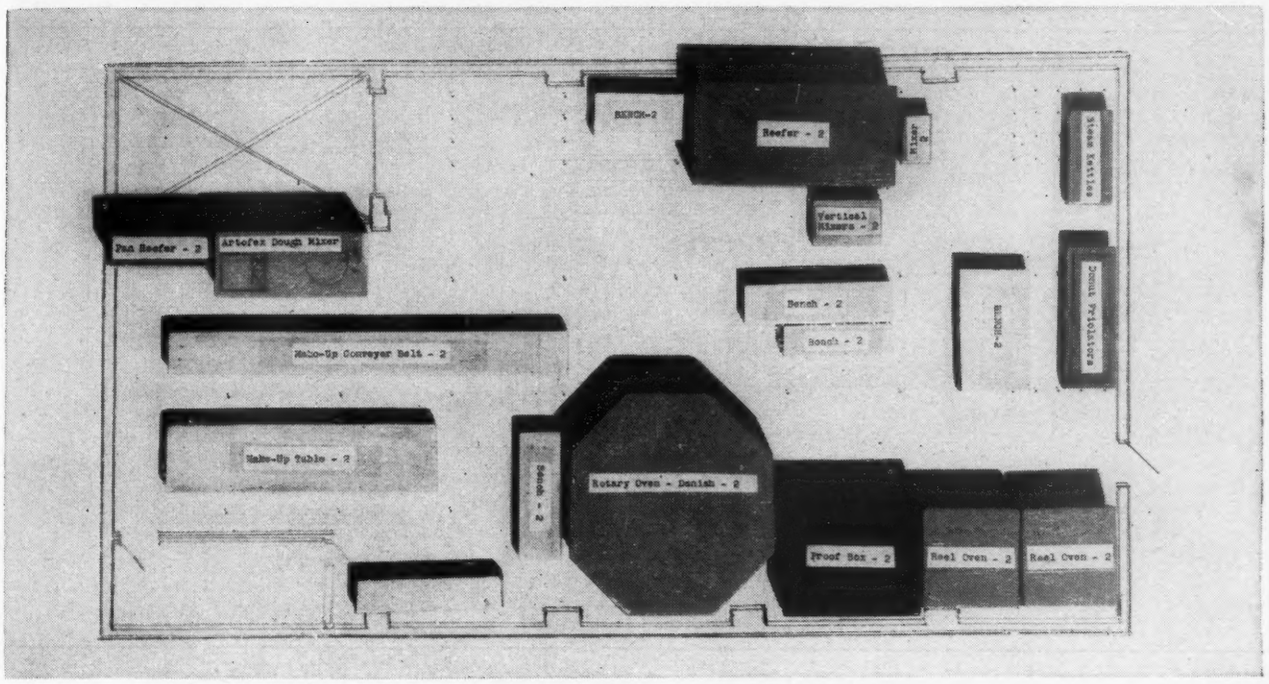
A NEW engineering tool, the three dimensional transparent plastic plant model, constructed to scale, is an aid to both management and the engineer in the study of plant alterations. It helps an owner or manager, unfamiliar with blueprints, to understand a proposed layout plan and thereby simplifies the engineer's task in dealing with his client.

Like most tools, the device was developed to suit and remedy a specific need. As utilized by Douglas L. McIntyre, New York industrial engineer, the device provides a full package of visualization, of either actual or projected installations, perfectly clear at a glance to any bakeshop man from the president of the corporation down to the newest pan greaser.

Growing Pains

A well-known bakery corporation, built up from a small plant, had become a major enterprise in its city. Not very much attention has been paid to engineering considerations as baking technology evolved through the years. But increased labor costs, creeping up over a long period, brought a change in the situation. The need to make important savings in handling costs became urgent. The bakery corporation was faced with the immediate practical necessity of converting to a five day week. It was not feasible to get more work out of the average bakeshop employee. Only by distinctly improved production methods or by new construction could the situation be met.

The company had been working on an expansion plan. A building lot in a good location had been purchased. A scheme of construction and layout had been prepared by professional industrial designers. But construction would take time;



LOCATION of existing equipment on second floor is shown in this model. Each floor of the building can be studied similarly.

the whole outlook for building costs and conditions was uncertain and poor. Accordingly definite building plans had to be postponed.

Consultant Called

Confronted with this situation, the bakery president called in an industrial consultant to survey the whole operation and make recommendations. The industrial consultant's attention was focused on the existing plant. The aim was to assemble all the factors for an intelligent executive decision on whether to install new equipment in the old building or wait until the new building could be designed and constructed.

The old structure had been erected before World War I originally for a garage, and was not adapted to the requirements of a modern bakeshop. Nevertheless, for the foreseeable future it had to be used.

The president, with his labor problem more urgent, was willing to convert or renovate the plant, and to purchase new machinery provided it could be moved afterwards to a new structure without loss or damage.

Problem Analyzed

The industrial consultant proceeded to study actual and projected operations from the familiar standpoints of efficiency and economy. It soon appeared that important money-saving reforms were possible in the old plant, but that the experience of the bakeshop superintendents and employees should be drawn upon for practical application. How to tap this wealth of experience was a problem.

The blueprint method of presentation, historic and respected as it was, failed completely. It was evident that another method of presentation would be necessary. Cardboard templates movable on blueprints proved scarcely more effective. The observer, particularly the untrained observer, could visualize only one story of the plant at a time by the use of such replicas. An overall view of the operation, actual and projected, was impossible. The relationship between a cake mixer on one floor, with a chute, and a depositor on the floor below could not be readily seen.

New Tool Employed

At this point the new tool, complete visual presentation through a clear plastic model in three dimensions, drawn carefully to scale, was resorted to. Floor sections used in the building model were constructed of Lucite. Photographic film ink was used on the panels. In this manner, columns, walls, and other structural details of the building were shown. First a model of the existing plant, all floors, was constructed, complete with three-dimensional balsa wood templates of all the bakery equipment. Then a model of the proposed equipment and layout was provided. The detail of certain troublesome operational units and processes was clearly shown on a separate model.

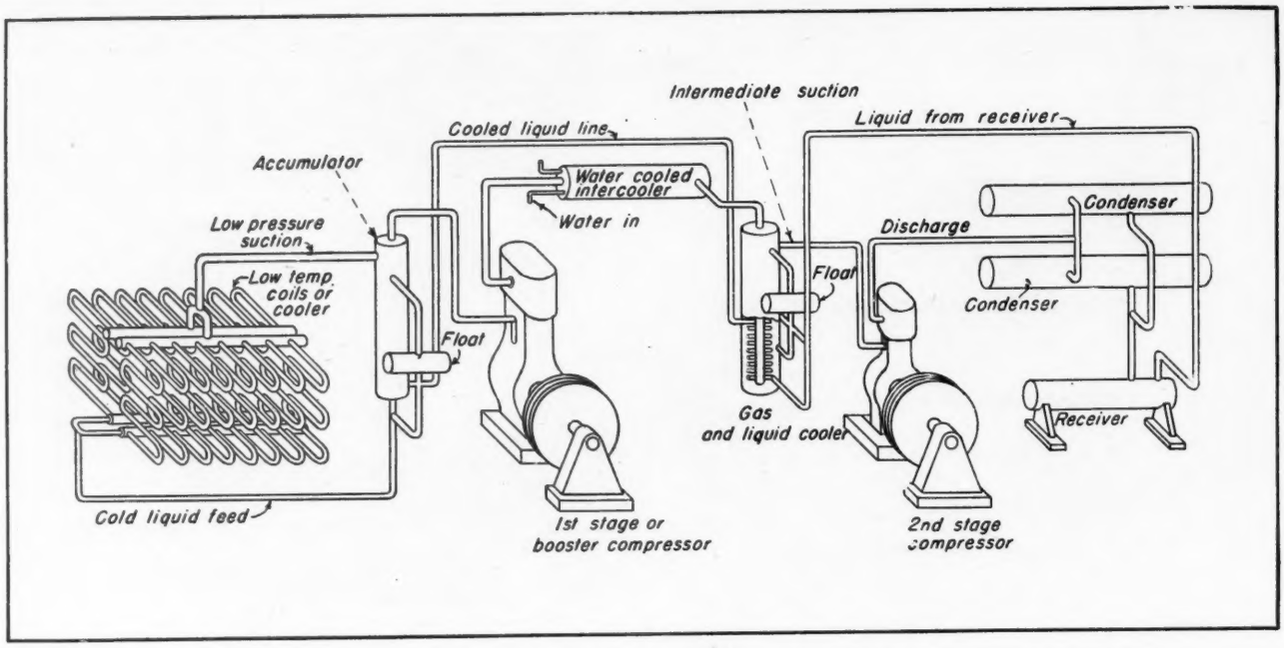
From then on everything went famously. All employees with experience and ideas to offer could see the models. The overall picture of processes and difficulties automatically showed up wasted motions, useless back work, senseless movements of a traditional but irrational character and even plain confusion. Any of the plant workers, regardless of education or experience, could draw valid inferences from the model. Executives for the first time could see their plant in its entirety as it actually was. The same overall view of the existing and the proposed systems was likewise available to shareholders and other interested persons.

Results Obtained

What did the visualization give the bakeshop president? First, a clear view of the old layout. Second, an ideal layout. Third, a realistis idea of the changes necessary. At first it had appeared that only a new oven need be purchased and the existing layout could continue. But the visualized layout showed that in addition to the oven, other new equipment would be necessary.

With this picture of the existing and the proposed plan, future operational costs were readily developed, and the economic value of the modernization was determined.

When all the factors were clearly presented, it was management's decision that complete modernization of the existing plant did not justify the necessary capital investment.



SCHEMATIC DRAWING shows arrangement of the Frick 2-stage "Booster" refrigerating system for low-temperature work.

Food Freezers Require

Characteristics of the various oils, extremes in temperature encountered.

By A. F. BREWER, Technical and Research Division
The Texas Company, New York, N. Y.

As any processor knows, foods can be frozen only as long as the machinery required is kept running in proper condition. And, of course, lubrication is a prime factor in machinery operation. With the development of a highly mobile refrigeration-packing unit—one that may be set up in a dozen localities in the course of the season—the problems of the lubricating engineer have been increased.

While this feature of portability is a definite advantage to the packer, it may prove a headache to the lubricating engineer. Normally in setting up such a plant, he is concerned only with power and water supply. With the portable unit, he must consider the varying cooling water temperature conditions. Furthermore, he must be sure of an available supply of his particular refrigerator oils for compressor lubrication.

The vertical, reciprocating, enclosed trunk-type refrigerating compressor so familiar in the manufacture of ice is quite generally used for quick-freezing and for maintenance of the required cold conditions in locker storage. In other words, refrigeration by compression is practiced. Such a system includes a compressor, oil separator, condenser, receiver, expansion valve, and an evaporator or refrigerator.

In the compression process the refrigerant or cooling agent is recovered after each expansion by means of mechanical compression. With certain variations in construction and arrangement of equipment, the compression process is adaptable to any one of the modern accepted refrigerants.

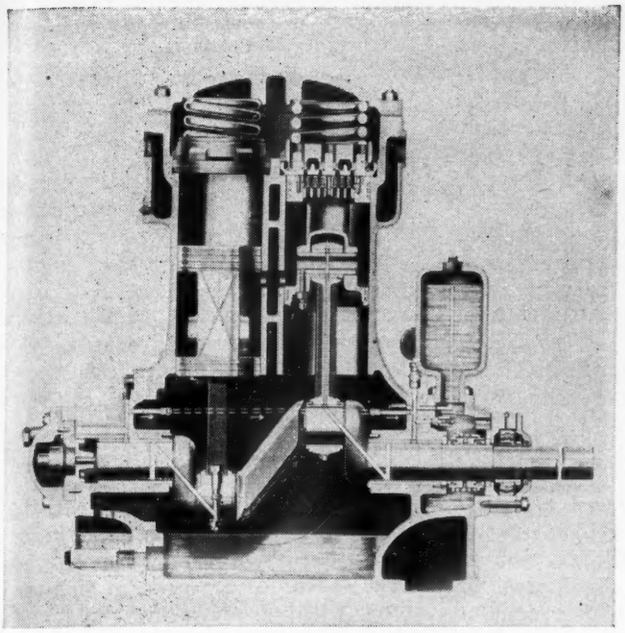
In service, the gaseous refrigerant must be sufficiently compressed and cooled to convert it to liquid form. Under compression alone, it will still remain as a vapor due to the fact that the application of pressure raises the temperature above the liquefaction point. So some form of condenser is necessary.

Prior to condensation, however, the gas is usually passed through a suitable oil separator or trap in an attempt to free it of any excess lubricant that may have passed over from the compressor cylinders. From the oil separator the hot refrigerant then passes to the cooling coils of the condenser, where its temperature is sufficiently lowered by means of air or cold circulating water to convert it to liquid form. It is then capable of cooling.

This latter is brought about by passing the refrigerant through an expansion or regulating valve to the evaporating side of the system. Here, because of the naturally lower temperatures established, it evaporates and takes up heat, returning thereafter to the gaseous state. In so doing, it cools down to a relatively low temperature, and as a result, absorbs heat from the material to be cooled or frozen. The refrigerant is then returned to the compressor for repetition of the cycle.

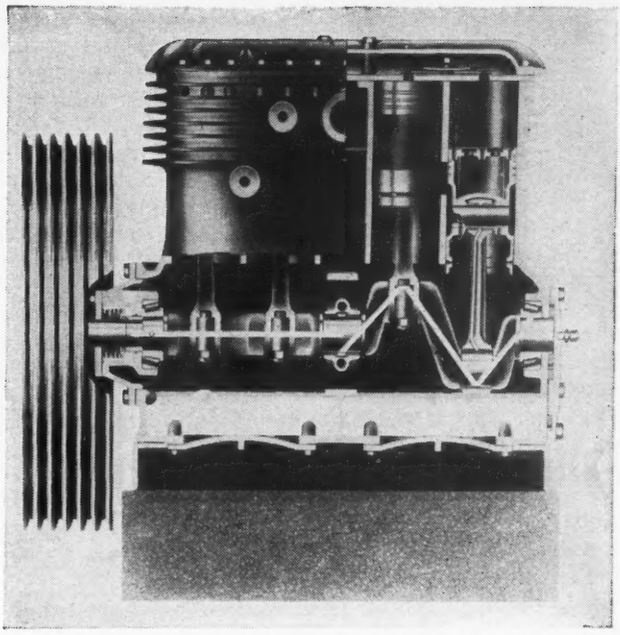
Cooling Water Temperature

Quick freezing may require exacting duty from the oil used for compressor lubrication, according to the temperature of the cooling water. The latter will have a def-



Courtesy of The Vilter Mfg. Co.

OILING SYSTEM features shown on a Vilter booster compressor.



Courtesy of Baker Ice Machine Co., Inc.

LUBRICATION a factor in a Baker "Freon" compressor design.

Proper Lubrication

equipment ,refrigerant used, all must be considered in selecting lubricants

inite effect upon the discharge temperature and hence the amount of heat to which the lubricating oil will be exposed on the cylinder walls and during the course of carry-over by the refrigerant. This must be considered when selecting the oil, whenever the popular type of portable quick freezing unit is involved.

Water cooling is utilized from the Gulf Coast to Canada. Obviously, water conditions will vary widely, for the well water of Maine will be much cooler than the normal river or stream water of Florida. In between these ranges there may be almost as much variation according to the source or amounts of water available. The economy of the refrigerating system as well as its capacity is affected by high water temperatures. This will enable adequate heat transfer and yet not too high an outlet temperature. The latter is desirable where cooling towers or heat exchangers must be employed to enable re-usage of the water supply.

So the compressor oil may have to meet almost automotive conditions on the high side, and yet possess ample fluidity at temperatures as low as –50 deg. F., to insure against congealing in the evaporator or at the expansion valve.

Low Temperature Problem

To attain the desired degree of freezing within the time specified for the food products under treatment, the quick-freezing process must be carried out at temperatures as low as –45 to –50 deg. F. The oils for compressor lubrication must give dependable protection and resist carry-over with the refrigerant to the heat exchange parts of the system. As this heat exchange subjects any oil present to quite as low temperatures as are brought about by expansion and evaporation of the refrigerant, the oil must contain no component which will congeal in sufficient volume to remain on the expansion valve or within the evaporator. This will cause faulty operation of the valve and reduce the subsequent rate of heat transfer in the evaporator.

In quick-freezing refrigeration, ammonia is most widely used. With this chemical, oil trap or separator installations have been perfected for complete oil removal from the refrigerant before the latter reaches the evaporator.

Ammonia forms a physical mixture with hydrocarbon lubricating oils in which it is essentially insoluble. Other refrigerants, which are soluble, require careful consideration from this point of view—notably the fluorinated and chlorinated "Freons," Carrene and methyl chloride. These refrigerants tend to reduce the viscosity of the oils with which they go into solution. Oil and refrigerant mixtures are hard to break, even with the most efficient oil separators available; hence the usual precautions to keep the components apart wherever possible.

How Quick Freezing Temperatures Affect Oil Selection

By reason of the unusually low temperatures required in quick-freezing operations, the compressor oil should be capable of meeting these without wax congealing or ice forming at the expansion valve, and without deposition in the evaporator. This requires an oil which is virtually free from water and one which shows a sufficiently low pour test to indicate only the necessary amount of paraffinic hydrocarbons for a balanced lubricating ability. The viscosity should nor-

mally range from 150 to 300 seconds Saybolt Universal, according to compressor design and the operating conditions.

The other physical characteristics are of little concern to the operator; they have no bearing upon the lubricating ability of a refrigerating compressor oil and may only be indicative of the type of crude from which the oil has been produced. In quick-freezing service where single-stage or booster compressors without intercoolers are employed, the compression temperature may approach 300 deg. F. on the discharge side. This, however, should cause no concern, since in normal service the average high-quality compressor oil will not show appreciable evaporation at such temperatures. As ordinarily understood, the flash point is a rough measure of evaporation. There is no fire hazard involved because there is no source of ignition and no air present in closed systems to support combustion.

The Oil Characteristics

The petroleum industry uses the utmost care in selecting the crude oil stocks from which the refrigerator oils are refined. Stability under high temperature conditions in turn is assured by the use of selective solvents for removing the unstable hydrocarbon components during the course of refining. The result has been the development of a series of processes capable of producing the type of refrigerator oil today which is ideally suited to the operating conditions.

This superiority is evidenced to the refrigerating plant operator by more dependable performance, and the normal absence of an excess of objectionable deposits.

The chemist denotes this superiority by comparing physical specifications and by the use of certain accelerated service tests. These latter are based upon resistance to oxidation and normally subject the oil to controlled and elevated pressure and temperature conditions in an atmosphere of oxygen. An oil which will resist the precipitation of sludge or gummy matter under such conditions will function satisfactorily in the presence of any of the refrigerants generally used today. In other words, the oil will meet the requirements of the refrigeration industry.

The operator must respect these facts when selecting his operating conditions, with full appreciation that lubrication of the refrigerating compressor is unique in that the effect of petroleum oils upon parts not requiring lubrication is quite as important as the lubricating ability. In other words, he must look beyond the compressor and consider what may happen if his oil becomes so sluggish, when carried over by the refrigerant to the expansion coils, as to congeal therein and reduce the rate of heat transfer and the refrigerating capacity. This requires knowledge not only of the pour test of the oil he may be considering, but also the minimum temperatures which may prevail in the evaporator.

Significance of the Pour Test

The physical effect of temperature is an interesting phenomenon when considered with respect to various fluids. In the case of petroleum oils it is not the same as with the more simple fluids such as water, alcohol or glycerine. Petroleum oils, being complex combinations of hydrocarbons of various melting or freezing points, behave like solutions and frequently certain of the constituents will congeal as the temperature is lowered, before solidification of the entire mixture.

These are interesting phenomena which can only be explained by change in physical structure of the hydrocarbon constituents. They are the reasons why such infinite care must be taken in observing the pour test of an oil under standardized conditions, and why check results by different laboratories are so often difficult to obtain. Just slight variation in the rate of cooling or the least agitation or stirring may affect the results. Even the preheating of a sample by carrying it in a closed car on a hot summer day may throw the subsequent laboratory results off to some extent. In other words, the pour test is only a comparative value due to the method of test being designed to cover a variety of variables.

It is especially important for the laboratory to avoid stirring or agitation while cooling as movement of oil destroys or changes the fine network of microscopic particles of paraffinic bodies which are separating out. Authorities feel that an oil which is stirred will solidify at lower temperature and hence show a false pour test.

The pour test is not significant when the oil is used in conjunction with a refrigerant in which it is soluble. In this case, the important factor is whether or not wax or heavy oil molecules will precipitate from the oil-refrigerant mixture at the lowest temperature encountered, and thus deposit to plug orifices or coat evaporator coils.

Viscosity a Function Of Operating Conditions

Compressor lubrication in quick freezing service requires consideration of the oil viscosity from a constructional and operating viewpoint. The oil is not subject to appreciable viscosity-reduction when mixed with ammonia as occurs with the chlorinated or fluorinated types of refrigerants. Oil film formation and maintenance on cylinder walls and bearings, however, are of vital importance; the viscosity has a direct relation thereto.

Viscosity is a definite factor where enclosed crankcase, high-speed machines are used in connection with evaporating systems which may allow liquid refrigerant to return to the compressor, and dilute the oil therein.

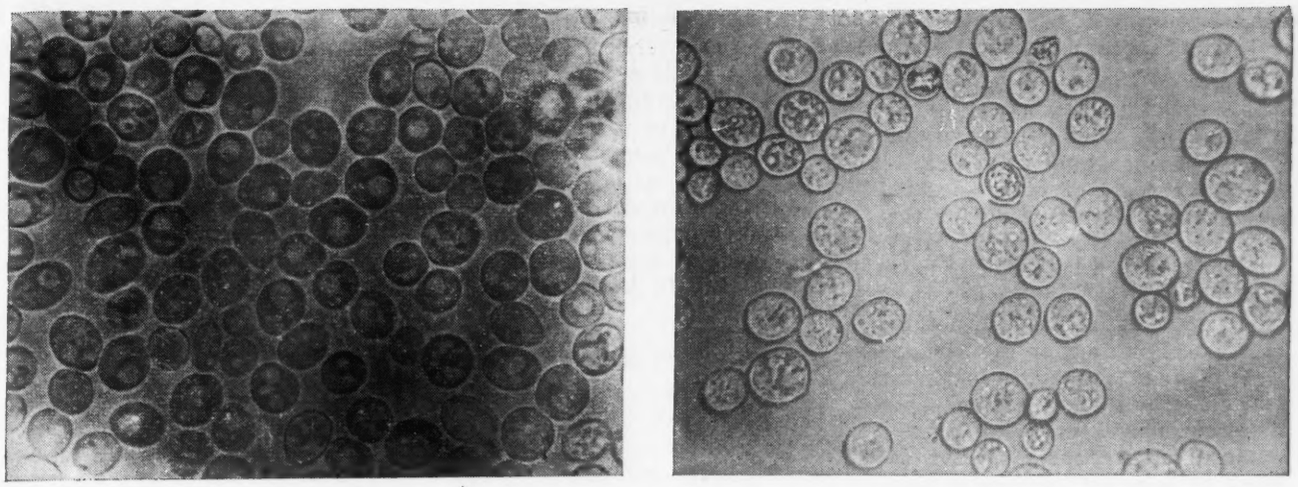
With "Freon" refrigerants, methyl chloride or the Carrenes, their mutual solubility with petroleum lubricating oil depends upon the physical nature of the refrigerant in question. When they are in the liquid phase, all are entirely miscible with petroleum oils. When such refrigerants are in the gaseous phase, however, the oil being almost entirely liquid absorbs only a small portion of the gas. In other words, the respective refrigerant vapors will go into solution less readily, dependent upon the prevailing pressures and temperatures.

The amount of any such refrigerant which may be absorbed by a mineral oil will be dependent also upon the viscosity of the oil at the temperature of contact. As the viscosity is increased the amount of refrigerant absorbed will decrease. In turn, larger amounts of "Freon," metyl chloride and Carrene are absorbed by mineral oils at higher pressures and lower temperatures, just as smaller amounts will be absorbed at lower pressures and higher temperatures.

The speed, the capacity and the type of compressor (whether air or water-cooled) principally will govern the viscosity of oil to be used.

The one oil usually lubricates the entire machine, serving both the cylinders and the bearings. It should not emulsify to any great extent, for this might cause clogging of the lubricating system or impairment of refrigeration should oil or emulsions work past the piston rings and over to the refrigerating side.

(*Continued on page* 222)



VIABLE YEAST CELLS, per unit of weight or volume, are more important than total weight of yeast solids when the product is to be used for fermentative effect. Photomicrographs show lager yeast cells (left) an dale yeast cells (right). Mag. 750 X.

Yeast Estimation Methods: When And How To Apply Them

Numerous methods are available for determining yeast quantity. The one selected should furnish data applicable to the use to be made of the yeast

By EARL D. STEWART, Director of Research, Schwarz Laboratories, Inc., New York, N. Y.

YEAST quantity can be related to yeast dry substance, number of yeast cells, weight of pressed yeast of some stated moisture content, usually 30 percent, or to a volume of yeast suspension of specified solids or moisture content. The use to which it will be put, however, governs the concept of yeast quantity in no small degree and should not be overlooked in making determination of it.

If yeast is to be used for fermentative effect, the number of viable cells per unit of weight or volume is more important than total weight of yeast solids. When used for production of dry yeast or yeast hydrolysates, the quantity of yeast dry substance becomes more important than the number of yeast cells. When sold as pressed yeast for bakers' use and then used for its fermentative power, both cell numbers and dry substance must be considered. In practice, however, the baker is actually interested in dough-fermenting activity per pound of yeast without regard to either cell-numbers or weight of yeast dry substance per lb. The gas evolution methods of evaluating yeast for baking purposes commonly disregard both unless a reason for unusually low or high activity is being sought.

Counting and Plating Methods

There is good reason to believe that fermentative power of yeast is a function of the number of cells present, rather than of yeast weight, assuming that the yeast is physiologically vigorous. In any case, for liquid or pressed yeasts where non-yeast solids in appreciable amount are known or suspected to be present, a count of viable cells per gram is the most satisfactory and reliable way of estimating the quantity of yeast present.

A haemocytometer count of viable cells,[1] though somewhat tedious to make, is not difficult. It can be made in a relatively short time, and this is a great advantage in brewery work that other yeast determination methods do not possess. While the method does not distinguish between small and large cells, and some arbitrariness is involved in counting of budded cells, this is of little consequence if the counting method is used consistently, since fermenting power is being estimated, and this depends on cell numbers more than on cell weight. If the yeast is mature and has come into biochemical equilibrium with the beer it has fermented, the cells will not be seriously irregular in size. An estimate of yeast dry substance may be made from cell count data by calculating the ratio of cell-count to dry substance, determining the latter on the same sample of yeast. Too much accuracy cannot be assumed for such estimation, however, probably not better than 85 to 90 percent.

Cell counting methods for pressed yeast are of little practical value. A count can be obtained for the sample under examination, but the difficulty of obtaining a representative sample makes the results obtained subject to large errors. If a figure for the number of cells per gram is required, a better value is obtained by preparing a suspension of the yeast, making a cell count and a yeast dry substance determination on aliquot parts of it. The number of cells per g. of yeast dry substance, or of pressed yeast of stand-

ard solids content, usually 30 percent, may then be calculated.

Because of the time required for their completion, plating-out is of little value for practical purposes in determining yeast quantity, or cell-count, of a mass of yeast. Before the 48 to 72 hr. necessary for the colonies of yeast to become large enough to count satisfactorily have elapsed, the yeast will either have been disposed of or used. If not, its condition is no longer the same as it was when the plating-out was started. Plate count methods are therefore useful only for routine checking of yeast condition, for isolation of cells, or for special types of investigation.

Yeast Solids Determinations

While an estimate of yeast dry substance can be made from the number of cells contained in a unit weight or volume of yeast mass, direct determination is to be preferred where it is possible. Numerous ways by which solids determination may be made have been indicated.[2] Before applying any of them, however, it is well to remember that satisfactory solids determinations can be made only on suspensions of yeast cells in water.

Dissolved or suspended non-yeast solids may lead to erroneous results with direct weighing, turbidimetric or viscometric methods. A molasses yeast fermentation, for example, may have cells suspended in a beer of about 1.0 deg. Balling, or about one g. of non-yeast solids per 100 ml. Such a suspension may contain about 1.5 g. of yeast dry substance per 100 ml. Drying a 10 ml. aliquot of such a suspension, without first removing the dissolved solids, would lead to a yeast substance estimate 1.67 times the true value.

In brewers yeast, suspended solids (non-yeast) plus dissolved solids in the beer suspending the cells, may make the error still greater.* In a grain distillery fermentation with all the grain mash-residues present, yeast solids determination becomes impossible. Cell counting gives more reliable data under these conditions.

Brewers yeast suspensions may be freed of some of their non-yeast suspended solids by passing them through a 100-150 mesh screen. Yeast solids determinations of improved accuracy may be made on such suspensions by one of the centrifuge methods. It is difficult, if not impossible, to estimate the yeast in the oversize from the screening operation, however, so the yeast solids in the screened suspensions cannot be referred to the total unscreened sample. This may be an entirely satisfactory procedure if the proportion of oversize is small, or considered as waste, or if no figure for total yeast solids, including that in the oversize, is desired.

*The drying method in the official A.S.B.C. methods of analysis determines total solids in yeast,—that is, yeast dry substance, plus non-yeast solids.

Centrifuging and Drying

By using a centrifuge yeast can be separated and washed free of dissolved solids in a very few minutes, and yeast dry substance can be determined readily by direct drying and weighing. Suspended solids are not removed, however, and centrifuge determinations on yeast containing non-yeast suspended solids are therefore subject to error. Sometimes a differential settling can be used to effect a partial separation, especially if the non-yeast solids settle rapidly so that the yeast can be decanted from them. Fifteen-ml. centrifuge tubes, preferably graduated, along with a centrifuge of the "clinical" type, are very useful tools for these determinations. The angle type of centrifuge head, while giving a quick and sharp separation, is less useful if the volume of the yeast thrown down is required.

If a 10-g. portion of pressed yeast, containing about 3 g. of yeast dry substance, is made up to a uniform suspension of 100-ml. volume, and 15 ml. aliquots are centrifuged in graduated tubes for 5 min. at 2,500 rpm., the yeast plug in the bottom of the tube will have a volume of approximately 2.0 ml. The error is of the order of 10 percent. Within this limit, the quantity of yeast dry substance per 100 ml. in a fermentation can be estimated from its centrifuge volume, obtained as just described. By multiplying the volume of the yeast plug in ml. by 1.5 the yeast dry substance per 100 ml. is obtained and a similar multiplication by 5 gives the quantity of pressed yeast of 30 percent solids. For example, if the centrifuge volume is 0.4 ml., the yeast suspension contains 0.6 g. of yeast dry substance per 100 ml., or 2.0 g. of 30 percent solids pressed yeast.

From the simple relation,

lb. per gal. = g. per 100 ml. ÷ 12,

estimates for fermentations of any size are readily made.

For more precise determinations, weighed centrifuge tubes may be used. If the yeast concentration is too low to yield about one ml. of yeast plug per 15 ml. tube, a second or third aliquot may be centrifuged in the same tube until approximately one ml. is obtained. The beer is carefully poured off after each centrifuging.

After the last removal of beer, 10 ml. of distilled water is added to the tube and the yeast plug is stirred into suspension with a glass rod. Two ml. of water from a wash bottle suffice to rinse off the rod and fill the tube to the 13-ml. mark. The tube is closed with a rubber stopper and shaken vigorously a few times, then the stopper is removed cautiously and rinsed with distilled water sufficient to bring the total volume in the tube to 15 ml. After centrifuging for 5 min. the water is poured off carefully.

The washing process may be repeated as often as necessary. Following the final washing, the outside of the tube is wiped carefully with a clean cloth and it is placed in a nearly horizontal position in an oven at 105 deg. C. and dried to constant weight. Since about 14 ml. of wash water is used each time, three washings should reduce the concentration of solids in the beer surrounding the yeast cells to

$$\frac{1}{2 \times 14^3}$$

or less than two 10-thousandths of its initial value, on the assumption that one ml. of yeast plug contains ½ ml. of beer. This reduction makes the beer solids entirely negligible in comparison with the weight of yeast dry substance.

This procedure offers an excellent way of arriving at the true yield of a yeast fermentation. It is only necessary to get the yeast uniformly suspended and to know the total volume of the fermenter. Then, by taking a sample of 100 ml. or so, and separating and drying the yeast, a good estimate of the yeast content of the fermentation may be made. The method is applicable to fermentation on any scale from one to 100,000 liters, and gives the true yield of the fermentation with the same degree of accuracy that the volume of fermenter contents is known.

Other Analyses Included

By using tubes of 20 or 50 ml., it is relatively easy to centrifuge and wash the equivalent of 10 to 20 g. of pressed yeast. A known volume of fermenter contents, say 250 ml., may be used for the separation. The beer and washings are combined and made up to say 750 ml., and the yeast is transferred quantitatively

to a 100 ml. flask. Aliquots of 10 ml. of the yeast suspension are pipetted into weighed aluminum moisture dishes and dried at 105 deg. C. for 5 hr. Using the same pipet, other 10 ml. aliquots are used for nitrogen and phosphorus analyses, or for cell counts and fermentation tests, all of which can thus be related to yeast dry substance with great accuracy.

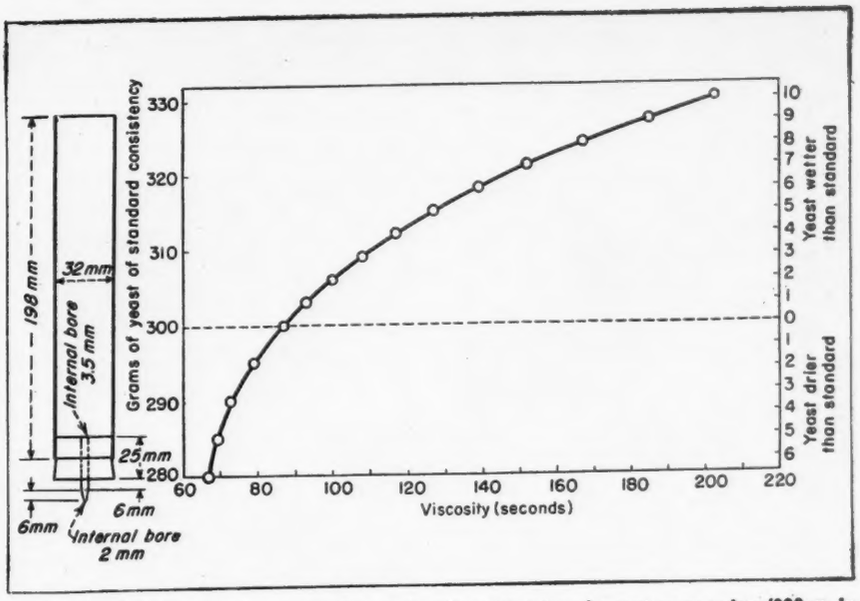
The beer and washings mixture, having been made up to three times the volume of the yeast suspension originally taken, may be analyzed for sugar, ash, solids, nitrogen, and so on, and the results related to the fermenter contents without making any assumption as to the volume in the fermenter that is occupied by the yeast. The yeast and beer analyses, in conjunction with the yeast dry substance determination previously described, permits calculation of balances with considerable accuracy on the nutrients put into a fermentation.

In factory practice the output of yeast depends not only on the amount of yeast solids in the fermenter at the close of the fermentation, but also on the losses incurred separating, washing and pressing. Determination of true yeast yield by the method suggested above offers a basis for calculating the efficiency of recovery operations.

Yeast Solids Determinations

Finely divided pressed yeast dries out very readily, and samples may be dried to constant weight easily. While drying is easy enough, the irregularity in moisture content of yeast pressed in filter presses makes application of the percentage moisture obtained to other lots of yeast, even of the same pressing, quite unjustifiable. Because moisture in pressed yeast will vary from press to press, from chamber to chamber in the same press, and with different distances from the feed point in the same chamber, it becomes next to impossible to obtain a representative sample during pressing operations. Well pressed yeast will show 68 to 72 percent moisture when dried at 105 deg. C. A fermentation containing 3,000 lb. of yeast dry substance should, on this basis, yield 9,380 to 10,860 lb. of pressed yeast, a range of 1,480 lb. Estimates of yeast yield based on random samples are therefore subject to considerable error and have little to recommend them.

A freshly cut pound of yeast, since it has been thoroughly mixed with water and plasticizer before cutting, will be quite uniform as to moisture. If the yeast is not kept in a humid atmosphere, however, the ends and corners of the cake will shown signs of drying out after a few hours. If it is necessary to relate properties of pressed yeast to yeast solids or to a standard yeast of 30 percent solids, a sufficiently large sample should be made into a uniform suspension, and the property determined on the suspension at the same time that a solids determination is made. Then, by calculation, the true relation of the property to yeast solids or to a standard yeast can be made.



VISCOMETER of pipet type is used to determine viscosity of yeast suspension (300 g. in 100 g. water). Calibration curve converts viscosity to standard consistency.

Bakers' Yeast

Yeast for bakers' use is made into pound units which are used in a dough batch by counting without weighing again before use. Changes in percent of solids of the units are therefore of no consequence for large dough batches, provided the dough fermenting activity of the yeast has undergone no change since the yeast was cut. In experimental baking or fermentation studies where weighed pieces of yeast taken from the same pound are used, this is no longer true. To get a uniform quantity—and quality—of yeast into a series of experimental fermentations or bakings, aliquots of a uniform yeast suspension should be resorted to. Such suspensions may be kept in the refrigerator for several days without undergoing appreciable change in solids content or loss of fermentative activity.

When using any drying procedure for determining yeast solids, it is well to remember that respiration will be accelerated during the early stages of drying before the temperature of the yeast reaches the thermal death point. If the mass of the yeast, or volume of the suspension being dried, is large enough to prolong the time of reaching the thermal death point unduly, the loss of solids by respiration may lead to low results. In the methods suggested above, the quantities of yeast and suspension are small enough to avoid appreciable losses.

Drying is also hastened by using thin layers of suspension or films of yeast. The official method for determining total solids in yeast* recognizes both these factors by calling for sand in the moisture dish to increase the surface exposed to drying and reduce case hardening, and by adding 5 ml. of alcohol to 10 ml. of yeast suspension, a concentration that will stop respiration by killing the yeast before drying starts.

Other Methods

The viscometric method of Montgomery and White[3] is novel and ingenious as well as simple to perform. A pipet-type viscometer is used to measure the time required for a measured volume of a yeast suspension to flow through the orifice tip. From a calibration curve, prepared by using yeast of known solids content or "standard consistency," the solid content of the sample may be determined. This method should be of use to a yeast factory where it can effectively take care of a perennial problem, namely, that of turning out pounds of uni-

(*Continued on page* 230)

*Methods of analysis of the A.S.B.C., Yeast, 1. 1944.

THIS 1,500-GAL. ice cream trailer, designed for retail distribution, is pulled by an International tractor. Three doors on either side open to freezer compartments. The door in nose of trailer opens to a nonrefrigerated compartment, used for the return of emptied cans.

Trailers For Curb Sales

Ice cream trucks are replaced on some routes by specially designed tractor-trailer units that may alter retail distribution of all frozen food products

TRACTOR-TRAILERS have not been commonly used for retail ice cream delivery routes. Models of 1,000- and 1,500-gal. ice cream refrigerated trailers were recently built, however, to National Dairy Products specifications by the Fruehauf Trailer Co. Both models are now offered as standardized units to any buyer. This may presage a revolutionary change in the retail distribution not only of ice cream, but of other frozen food products. These units are alike in design. They differ only in length and dimensions, the 1,000-gal. model being 20 ft. long and the 1,500-gal. unit, 22 ft. Each trailer is fully insulated. They are refrigerated by means of eutectic or hold-over-plates in which ammonia is one of the solutions that can be used to bring the inside body temperature down to –18 deg. F. and hold it at not over 2 deg. F. after a full day's operation.

Standard Frame

Both models are of the conventional integral frame type. They are made of high-tensile steel with the side and end outside body panels of alloy aluminum and the roof of galvanized sheet steel. The body has a solid rear panel without a door. Each side has four doors, eight in all. The three rear pairs of doors give access to three insulated compartments extending the full width of the body. The forward set gives access to an uninsulated compartment in the nose of the trailer.

Models Available

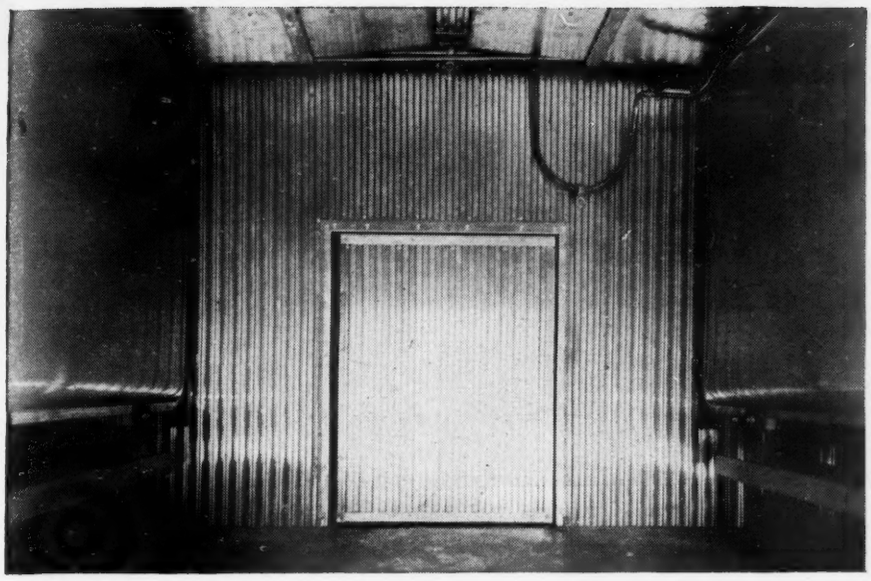
While the two trailer models are standardized in design and are available on demand, they are not stocked. They are built to the customer's order so that any variation desired in the method of operating the eutectic hold-over plates may be included in the specific blueprint and charged for accordingly.

The first two of the new trailers were delivered to the Frechtling Dairy Co., Cincinnati. Three more units were delivered, one each to St. Louis Dairy Co., St. Louis; Allen Ice Cream Co., Rockford, Ill., and Cloversleaf Creameries, Inc., Huntington, Ind., all National Dairy Products affiliates.

Advantages of these new ice cream trailers rest in their capacity to carry approximately twice the load of a 3- to 3½-ton straight truck, with a tractor of lesser rated capacity; light trailer weight due to the integral frame construction called for in the National Dairy Products specifications; the flexibility of the unit, which permits the substitution of another tractor, should the first break down, without the necessity of unloading and resorting the load in the trailer body as would be required with a straight truck; the assignment of the ice cream tractor to other work in the low-peak season, such as hauling fluid milk tanks or cases of milk; a short tractor-trailer turning radius to permit deliveries in cramped or restricted quarters, and a low trailer body height that permits the driver to load and unload while standing on the street, without the necessity of crawling into the trailer's insulated and refrigerated compartments.

Operating Problems

In order to convert the new tractor-trailer combination into a more economical type of vehicle for retail ice cream or other frozen or frosted food deliveries, the advantages over the conventional straight trucks must be integrated into the actual operating conditions. For example, on what type or length of route can 1,000 or 1,500 gal. of ice cream be delivered, within the limits of the working day, with or



THE VERTICAL Kold Hold plates, seen at left and right in this interior view, maintain temperatures as low as—18 deg. F. and no higher than 2 deg. at day's end.

without overtime, with one or more driver salesmen?

E. A. Kayser, president of the St. Louis Dairy Co., states that the main advantages of the trailer units, as his company sees them, are the reduction in weight as a result of the National Dairy Products specifications and the design that enables the driver to keep both feet on the ground when loading and unloading. The 1,000-gal. model has a free loading height of 43⅜ in. and the 1,500-gal. unit, a height of 44½ in. The former uses 8.25-15 tires and the latter 9.00-20. In addition, two doors on each compartment, one on each side, makes it possible for the slow-moving flavors to be loaded and unloaded on the street side of the body and the fast-moving flavors on the curb side. It is anticipated that this will greatly speed up individual deliveries.

The St. Louis Dairy Co. and other companies now operate 1,000-gal. standardized bodies on straight trucks. The 1,000-gal. tractor-trailers will not replace all its 1,000-gal. straight trucks, the company attitude being that there is a definite place for each type. The 1,000-gal. trailer has a top capacity of 1,085 gal. or 434 cans and the 1,500-gal. model, 1,540 gal. or 616 cans.

The 1,500-gal. trailer is definitely a two-day delivery route vehicle—out one day and back the next. The vehicle is so designed mechanically that it may be plugged in at the end of the first days' operation, at the point where it remains overnight, to recharge the hold-over plates and provide adequate refrigeration for the second day's run home.

The St. Louis Dairy Co. plans no change in the personnel for the trailer units. If one driver salesman has been able to get rid of a 1,000-gal. load within the limits of a working day on a straight truck he will be able to duplicate the work on a trailer. Nor does the company contemplate use of the ice cream tractor in the haulage of other products in the off-peak ice cream season. The company looks upon the use of a 1½-ton rated tractor to pull the 1,000-gal. trailer as bad practice because such a tractor would be underpowered. This would be even more true with the 1,500-gal. trailer, or with a 2,500- or 3,000-gal. tank load of milk.

Wide Compartments

The four compartments in each trailer extend clear across the body. The front compartment includes the rounded nose of the trailer. This front compartment is not insulated and is used principally for bringing back empty ice cream cans. The three rear insulated compartments are rectangular in section in both directions and have inside dimensions of 5 ft. 7½ in. width; 3 ft. 4¾ in. height, and from 3 ft. 11½ in. to 4 ft. 9 in. length.

Refrigeration is provided by six Kold Hold plates. These are hung vertically crosswise, one to form the rear of the front uninsulated compartment and another directly in front of the rear body panel. The remaining four plates are hung in two groups of two plates each approximately equidistant between the front and rear end plates to form the three refrigerated compartments. The Kold Hold plates are installed close to the ceiling with an open space between the bottom of the plates and the floor. The plates are 1⅞ in. thick, 36⅛ in. high and 66 in. wide. The two plates, grouped together, are spaced 3 in. apart. The sides of the plates form the compartments without other transverse members, with two plates serving each compartment.

Insulation consists of alloy aluminum outside panels on sides and ends with one layer of foil-covered paper; 3 in. of Ultralite Fiberglas, one layer of rope kraft paper; 3 in. more of Ultralite Fiberglas, and a lining of corrugated alloy aluminum to give a total thickness of 7⅞ in. Under a galvanized sheet steel roof the insulation consists of 7½ in. of Ultralite Fiberglas; one layer of foil-covered paper and a layer of rope kraft paper. The floor insulation is made up of a No. 26 gage galvanized steel floor made watertight; 5 in. of Rubatex and a corrugated alloy aluminum subfloor. Removable 1¼ in. duct boards are used on top of the floor to allow air circulation under the load.

THE SMALLER 1,000 gal. trailer uses a Ford cab-over-engine tractor. This low trailer—43⅜ in. loading height—gives the driver easy access to any compartment.

FRANK K. LAWLER

SIDNEY D. KIRKPATRICK

HALDANE GEE

For Greater Service To The Food Industries

Publisher announces editorial staff expansion—acting editor and executive editor appointed

THIS magazine's plans for 1948, as announced on p. 101 of our December issue, included a substantial increase in editorial content, greater picture coverage and a number of special editorial projects. To put these plans and policies promptly into effect has called for a corresponding expansion and strengthening of our editorial staff.

Effective Feb. 15, Sidney D. Kirkpatrick was appointed Acting Editor of FOOD INDUSTRIES. This is in addition to his duties as Editor of *Chemical Engineering*, the McGraw-Hill magazine from which FOOD INDUSTRIES was developed in 1928. A graduate chemical engineer and journalist, Dr. Kirkpatrick is well qualified to guide and counsel the enlarged and strengthened staff of FI.

Frank K. Lawler returned to FOOD INDUSTRIES on Feb. 15 to become Executive Editor. Shortly after graduation in engineering from Purdue University, Mr. Lawler joined McGraw-Hill, and he became a member of our editorial staff in 1933. Six years later he was made Managing Editor. In December, 1945, he was appointed Production Editor of *Business Week* and in 1946 was made Editor of the new *McGraw-Hill Digest*. During more than 12 years of association with FOOD INDUSTRIES, he became thoroughly acquainted with the problems and prospects of this important field.

Haldane Gee, who joined the FI staff in Feb. 1946, continues as Managing Editor. Dr. Gee brought to us a rich background of experience in bacteriology and chemistry, in research and production work, as well as in teaching and technical journalism.

C. R. Havighorst, Associate Editor in San Francisco, has returned to the West Coast to continue his important work as our editorial representative in this outstanding food-producing area. His responsibilities include a further strengthening and expansion of the special section "Western Food Industries" now being bound into all issues of FOOD INDUSTRIES going to subscribers in the Western States.

E. S. Stateler, Associate Editor, continues to cover the activities of Midwestern food industries from our Chicago offices.

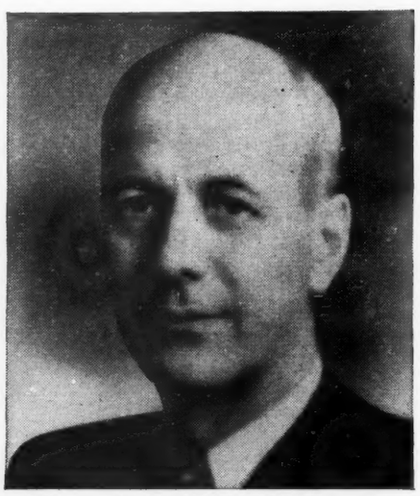
Consulting Editors Laurence V. Burton in New York and R. S. McBride in Washington, together with Assistant Editors J. A. J. Jones, Arthur V. Gemmill, John V. Ziemba and Engineering Editor Frank McCarthy—all in New York—round out the largest staff of food technologists serving any publication in this important industry.

I commend this enlarged staff to you, for they are yours to command.

W. A. Williamson

PUBLISHER

E. S. STATELER



C. R. HAVIGHORST

EDITORIALS

COMMENT AND OPINIONS

New Economic Factors

Is this it? arises on many lips and causes many a business man long hours of agonized worry whenever he ponders the gyrations of commodity and security markets and wonders what they may portend.

We heard and read all manner of comment on the situation by those who attempted to rationalize the recent grain slump, and we felt that even the most respected economists failed to include all the factors in their thinking. To be sure, fundamentals do not change, but there seem to be two additional fundamentals to be reckoned today that were never a factor before.

One of these is the economic tinkering of huge and powerful labor unions. Unless some of their leaders reverse their entire philosophy of recent years, they can be expected to call strikes for the purpose of demanding higher wages just to maintain consumer buying power. Whether you subscribe to their theories or not, these experiments may come about if labor's economic advisers develop the notion that the economy is slowing down for lack of sufficient buying power. This seems to be one of John L. Lewis' pet ideas. And, of course, a strike in any basic industry like coal will defer production and also postpone the satisfaction of many demands. This is not to be interpreted as endorsing or supporting his theory, but merely to point out that anyone who tries to forecast the future of economic events must integrate the foregoing with all the other ideas about filled pipelines and grain surpluses and diminished farm buying power.

The other new factor, it seems to us, is still more important and involves the changing political thinking of this and other nations. The idea is gradually dawning on all of the people that food is much cheaper than bullets, and that international generosity is by far cheaper than total wars. Taking the whole earth for our subject, not merely the people who might have enough dollars or gold with which to buy U.S. exportable food surpluses, it will be years before world hunger can be satisfied. It is calculated that Asia alone has had an increase in population during the past decade equivalent to the total population of the United States. Europe is calculated to have increased its population by 14,000,000 since 1936, and in 10 more years is expected to produce about 22,000,000 additional food consumers.

Obviously, the need for farm products is very large. Then there is a new philosophy of giving food to those who need it—rather than let them become so hungry and desperate they will start a war to get it. So it could well come about that our grain surpluses will not be allowed to burden the domestic market. Certainly, if either of these two "new" factors should come into play it should be clear that orthodox business economic conclusions could go far awry.

Margarine vs. Butter

THERE is little point to the opposition of certain dairy groups to the removal of excises and bans on margarine. If there were any danger of a surplus of butter in the near future, such opposition would be understandable. But the fact is that there are fewer cows per person in the United States today than at any time since 1850, when the cow population first became a matter of record. Each cow must supply all the dairy products for about 5½ persons.

While it is true that in the great depression the ratio was 1 cow to 4.82 persons, the productivity per animal has since increased slightly. Hence there is less likelihood of a milk shortage than the actual figures indicate. But it seems unlikely that the number of cows will increase relative to the number of people. One has to go back to 1910 to find a cow: person ratio (1: 5.39) closely approaching 1947 figures.

This is a healthy situation from the farmers' viewpoint, and it would be sensible for the opponents of tax-free colored margarine to keep in mind one very significant fact: Good margarine requires plenty of skimmilk for successful production. Unless the dairy farmers see fit to produce enough butterfat to force the price of butter down to figures below 50 cents a pound, they have no basis—moral, historical, commonsense or otherwise—for insisting on penalty taxes on margarine.

Furthermore, as we have often remarked, the continued sniping at margarine has only served to goad its producers into improving their product. Today many of the brands of margarine are as satisfying to the average palate as butter, and often are indistinguishable from it when colored.

The opponents of tax-free margarine have little to commend their cause while butter sells for around $1.00 a pound at retail.

"Civil War" Again

A BATTLE of giants has broken out between the edible fat and oil suppliers. It has the form of a triangular controversy, with each of the triangle corners under a crossfire from the other two. Domestic producers are all shooting at the importers of coconut oil. The efforts of these Philippine and other South Pacific areas are proving uncomfortably effective in bringing new supplies of cheap coconut oil and copra from there to compete with cotton, soy and milk fats.

Two corners of the triangle are filled by domestic producers. In one, the dairymen, seeking every possible advantage for butter fat, will marshal under leadership that represents unusual experience and effectiveness. In the other corner, daring to oppose the regimented dairy-

men, are both cottonseed and soybean oil producers. The latter two groups are supporting the margarine producers. At the moment their main heavy artillery is the margarine tax-repeal program.

We do not pretend to know who will win. But we are very sure of one fact. That fat or oil industry which neglects technologic improvement is needlessly weakening its competitive position. Food fats and oils will be in surplus shortly. Then there will be a great advantage on the side of the group which uses the best methods and machinery and does the best job of supplying products of high dietetic value at low cost.

Hold the High Level

IN a recent issue of the Department of Commerce publication, *Survey and Current Business*, is a discussion of present price-supply-demand relationships in the food industry. The author's thesis goes like this:

There was built up for the food industry during the war a market for high-quality processed foods among income groups that during prewar days were "marginal." Men and women in the armed forces, and the lower-income groups at home, ate more food and better food than many of them ever did before. They do not willingly go back to lower standards of food consumption.

This "reservoir of demand" which is being tapped now is in large part responsible for the fact that per capita consumption of food is now 5 to 20 percent higher, quantitatively speaking, than at any time in the 30 years between 1909 and 1939.

This increased food consumption, however, is now being supported by dollar expenditures that take 29 percent of the consumer's greatly expanded disposable income. Prewar, consumers spent only 23 or 24 percent of their income on food.

There is little basis for the assumption that the present ratio of expenditures for food will continue indefinitely. "The probability would appear to be on the side of adjustment toward—although not necessarily down to—the prewar pattern."

There is a job ahead for the food technologist and advertising manager if a high consumption level is to be maintained.

Others Can Copy

SINCE 1930, National Canners Association has kept up to date its Bulletin 26L—which lists recommended processes for the major low-acid canned foods. Each year a processing committee composed of representatives of the canning industry meets to consider new scientific data on processing. Then additional processes or revisions recommended by the committee appear in the next edition of the Bulletin.

Adoption of the standard processes by the industry in general led to important progress. Losses to packers due to understerilization were eliminated and consumers were protected against food poisoning. And now canned foods enjoy great consumer demand and are "the safest foods that come to the table."

Other branches of the food processing industry might profit from this example. Some of the current difficulties of frozen food packers, for example, might have been avoided by following a rule book on high-quality processing and storage.

Riding for a Fall

VIA the grapevine we hear that Company A has abandoned research and development work. Of course, not all of it has been stopped, but much has been cut off. Many ex-employees are making a bee-line to FOOD INDUSTRIES' editorial offices to seek leads on new jobs.

Thus, one has learned that one executive has uttered the quaint and absurd idea that the only reason any company does research is because its competitors are doing research. Also that Company B, the nearest competitor of Company A in point of size, has quit all research. Ergo: Company A has no need to do it, anymore. Away with this useless expense. Fire everybody—well, not quite everybody; keep enough on the job to look well from the outside.

So far, it's a fairly good case for the sort of monopolistic thinking that has put Britain where she is today. But there is more to this than meets the eye. There are other grapevines. And then, too, there are the ousted research workers from Company B who also beat a path to our offices to seek suggestions that may lead to new jobs. To outward appearances Company B has abandoned nearly all research. Hence Company A feels secure in firing a lot of good men.

But don't forget the other grapevines. They tell us that at the very time Company B is "abandoning research," it is simultaneously building a new research staff in secret in a distant city, also that its projects are really wows. Looks like a feint worthy of military genius.

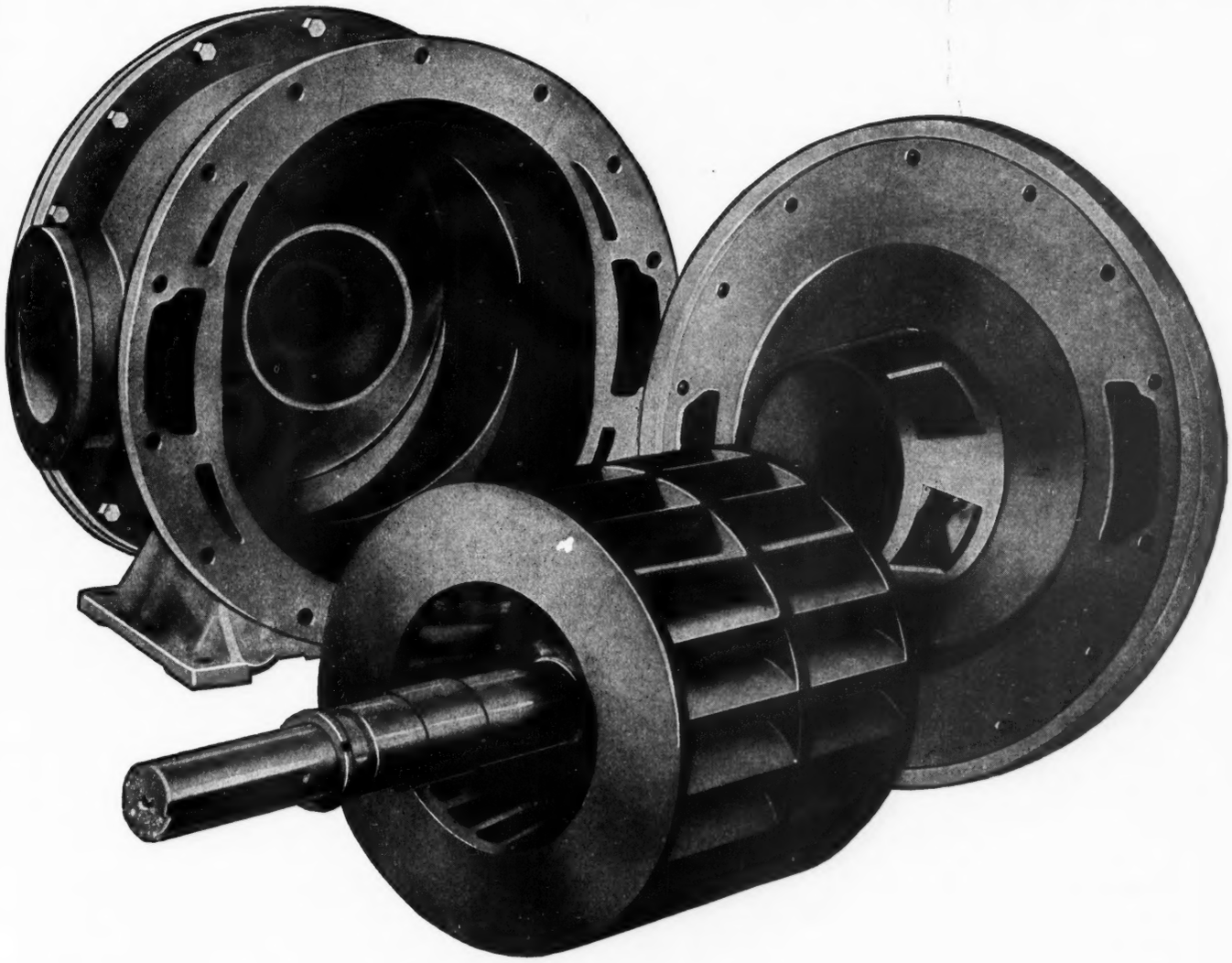
Seasonal Labor Problem

FOOD processors apparently face a worse than usual problem in procuring enough labor to handle this year's seasonal packs. U.S. Employment Service estimates a record peacetime labor shortage for summer operations in factories and on farms. It reports that 4,000,000 more workers will be required to fill openings this crop season in fields and processing plants.

Processors who have not already planned their labor-procurement campaign should do so immediately. Valuable assistance can be had by registering employment needs with State Employment Service offices, and by participating in an advertising campaign to recruit workers.

These state offices have received from USES ready-to-use advertising and recruiting material of various types. If this is not adequate, perhaps the hillbilly hand technic used so effectively by some southern politicians would get attention!

Only *Nash Vacuum Pumps* have all of these advantages



Nash Vacuum Pumps are simple, having but one moving part. These pumps have unusual characteristics. They will handle a gas and a liquid simultaneously. Slugs of liquid entering a Nash Vacuum Pump do no harm. Thousands are rendering service where this condition is present.

A unique feature of Nash Vacuum Pumps is that, in handling hot and saturated vapors, they have a condensing effect . . . The operating principle involves an internal liquid seal, which condenses and contracts hot vapors and gases . . . Unless the amount of hot vapor is great, other condensing devices are not necessary.

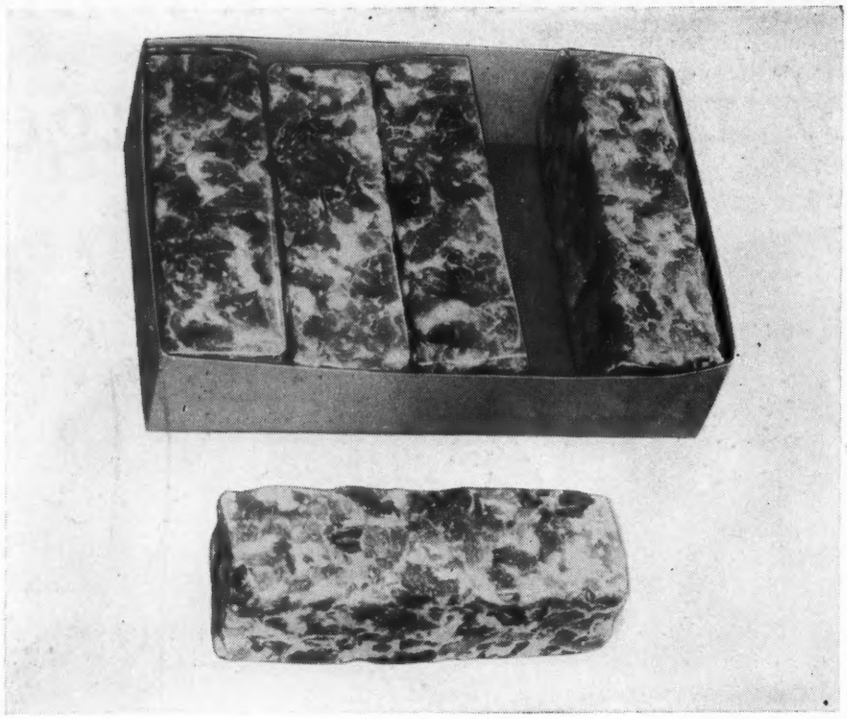
This liquid seal may be varied with the gas being pumped. On solvent work the percentage of recovery may be increased by using a suitable liquid as the pump seal and recirculating this liquid. Because of the complete lack of internal lubrication, the solvent cannot become contaminated.

Nash Vacuum Pumps are furnished in a wide range of capacities up to 5,000 cubic feet per minute. In single stage design they efficiently maintain vacuums up to 27 inches of mercury, and in two stage design vacuums above 29 inches.

THE NASH ENGINEERING COMPANY

226-A S. WILSON ROAD • SOUTH NORWALK, CONNECTICUT • U. S. A.

NEW PACKAGES & PRODUCTS



Lamb Stew Meat Molded and Frozen

DISTRIBUTION of Armour Star molded, frozen boneless lamb for stewing has been begun by Armour & Co. This is one of the company's many convenient fresh frosted meat items, developed for the institutional trade, with the object of simplifying meal preparation.

The stew meat is prepared from selected lambs, diced to uniform size, individually wrapped in 3 lb. molds with transparent material and packed five molds to a carton.

Other institutional packages of Armour Star fresh frosted lamb cuts are: Leg of lamb, lamb leg B.R.T., lamb loin, hotel lamb rack, lamb shoulder B.I., lamb shoulder B.R.T., lamb breast, lamb back and lamb shank.

New Cake Mixes

6-O'CLOCK FOODS, INC. of Norristown, Pa., has just added new cake mixes to their growing line of 7-Minit branded foods. These new cake mixes are used to prepare layer cakes or cup cakes. Two flavors are available, chocolate and golden.

The new mixes are another result of the company's efforts to produce high-quality, economical and time-saving food mixes.

Initial distribution is slated for the Northeastern States. New territories will be added in contiguous areas as production gets under way.

Package a La Creole

A NEW line of Longfellow House food delicacies is now being offered by direct mail from Longfellow House in Pascagoula, Miss. Soon these foods will be offered also at fine food shops and department stores throughout the country.

Such local creations as rice jambalaya shrimp Creole and spiced pecans will be marketed. Pecan delicacies, such as Pecan glace, Pecan Pralines and Spiced Pecans will come Cellophane-wrapped in attractive boxes.

Freshly caught Gulf Jumbo shrimp will be packed in hermetically-sealed, 7-oz. cans, ready-to-serve.

Apple-Lime Drink

B. C. FRUIT PROCESSORS LTD., will seek this year to extend the market for its newest product apple-lime drink. The drink, a blend of apple juices and lime juice, is enjoying moderate demand at the present time, but a campaign is being launched to expand the market as far east as Montreal.

Linerless Carton

A NEW improved linerless carton has been introduced to the ice cream industry by Marathon Corp., Menasha, Wis. The carton is end-constructed, and is equally efficient for automatic and hand set-up operations. It is designed to meet the exacting requirements of fully automatic line packaging.

Trouble-free closure and filling are assured by sturdy construction and accurate scoring.

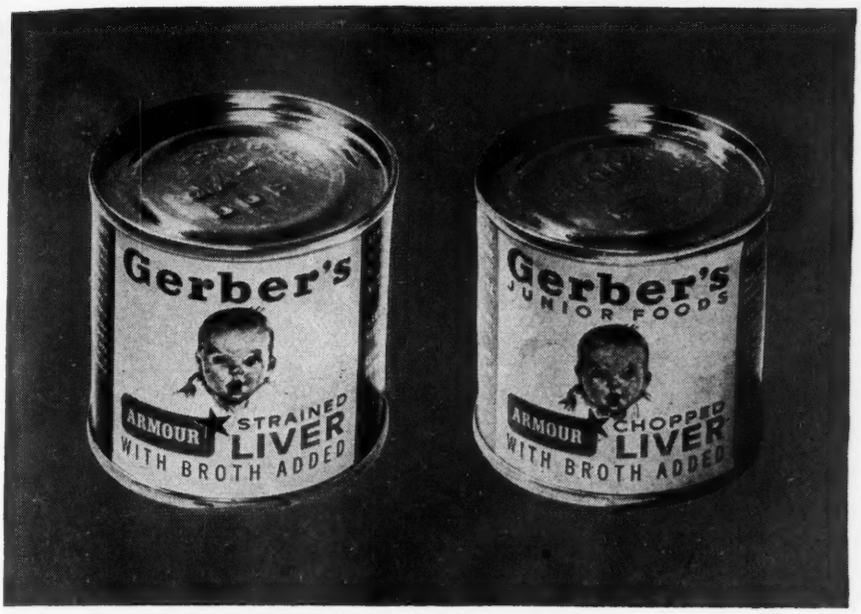
Chocolate Almond Bar in Transparent Window Box

RECENTLY introduced for nationwide distribution is the Almond Prevue bar made by Cook Chocolate Co., Chicago.

It is packed in a folding box with a transparent window, 24 bars to the carton and 12 carton to the shipping container.

The bars consist of milk chocolate with whole roasted almonds.

Net weight of the box is 1⅜ oz. It retails for 10¢.



Gerber-Armour All-Meat Baby Foods

GERBER PRODUCTS CO. and Armour & Co. have pooled their laboratory production and merchandising "know how" to market a new and improved all-meat line of baby food. It is an important addition to Gerber's regular line of baby foods.

In addition to the Gerber name and the picture of the famous Gerber baby, each can will carry the Armour Star logotype.

The meats are packed in special 3½ oz. cans and bear the Seal of Acceptance of the Council on Foods and Nutrition of the American Medical Assoc. They are ready to heat and eat.

First products being marketed are: Strained beef, chopped beef, strained liver, chopped liver, strained veal and chopped veal. Other varieties of meat will be added as rapidly as possible.

Design Credit: Raymond Loewy, Chicago, Ill. Can Manufacturers Institute photo.

Egg Albumen Substitute

PRO-TAN, a new modified albumen, is now available to the baking and confectionery industries as a substitute for egg albumen. The method of modifying proteins for specific uses in the confectionery industry is new and original. It was developed by T. H. Angermeier and Co., New York. It consists of subjecting a blend of proteins to a special process, resulting in protein stabilization.

The new albumen is already in use in confectionery plants where it has been found easy to handle. It imparts quality and shelf-life.

For replacing frozen egg whites in making of confections, one pound of Pro-Tan is used in place of 6 to 8 lb. of frozen whites. Frappes made with Pro-Tan and egg albumen were compared over a six months test period. In all cases there was less shrinkage in Pro-Tan frappes.

Extreme heat of high cook bobs has no detrimental effects on Pro-Tan frappes. Actually, heat is necessary to effect complete stabilization of Pro-Tan.

Cottage Cheese for Lent

SHEFFIELD FARMS CO., INC., N.Y.C., is now offering a new prepared dairy food, Spring Garden Salad Cottage Cheese.

This high-in-protein food consists of creamed cottage cheese blended with finely chopped fresh celery, parsley, red onions, green peppers, pimentoes and carrots. It is sold ready-to-serve and can be

For DEPENDABLE protection against insects...

Keep food-processing and food-handling machinery insect-free with ACRYLON* Spot Fumigant. Highly toxic to all insects, ACRYLON is poured into machines where infestation normally builds up most quickly. Relatively short exposure is required, and regular applications will keep machines insect-free at all times.

ACRYLON vaporizes completely, leaving no residue. It will not clog machinery nor harm food products in any way, and it is non-flammable.

ACRYLON is economical, too. A few ounces in each danger spot assure complete insect kill. Available in 15-gallon and 50-gallon drums.

For Thorough Building-Wide Insect and Rodent Control

specify AERO* LIQUID HCN Fumigant. Use it periodically with in-between applications of ACRYLON to strategic spots to assure constant pest control in food plants.

*Reg. U. S. Pat. Off.

Write for detailed information

AMERICAN CYANAMID COMPANY

Agricultural Chemicals Division

30-S Rockefeller Plaza • New York 20, N. Y.

Branch Offices: Brewster, Fla.
628 Dwight Building, Kansas City 6, Mo.
1207 Donaghey Building, Little Rock, Ark.
111 Sutter Street, San Francisco 4, Calif.

KEEP YOUR PLANT INSECT-FREE AT ALL TIMES WITH LIQUID HCN AND ACRYLON

smart packaging

. . . BUILDS BRAND PREFERENCE!

Like a smartly dressed woman—a product that is packaged with an eye toward consumer preferences will always get more attention! Today's merchandising trends demand a package that's on its toes—a package that has color, appetite-appeal, display value—and is dressed in the latest sales fashion.

Milprint packaging experts specialize in surveying your packaging problems, from production to sales. Why not let them help you build new brand preference with a new—and smarter package.

PACKAGES BY MILPRINT

Packaging Headquarters to American Industry

MILPRINT Inc. SALES OFFICES IN ALL PRINCIPAL CITIES

PACKAGING CONVERTERS • PRINTERS • LITHOGRAPHERS

plants at | MILWAUKEE, PHILADELPHIA, LOS ANGELES, CHRISTIANA, PA.
SAN FRANCISCO, TUCSON, VANCOUVER, WASHINGTON, STOUGHTON, WIS.

general offices: MILWAUKEE, WISCONSIN MILLS AT DE PERE, WISCONSIN

used to prepare new meatless dishes.

The cheese salad is delivered to the home by the milkman in decorated, safe-edge drinking glasses. The 8½-oz. jar sells for $0.22. The food can be purchased also in 8 oz. Lily-Tulip Corp. Nestrite containers at the store or delicatessen.

Moisture-Proof Container

A NEW improved Sealright Thermorex container has been developed by Sealright Co., Inc., Fulton, N. Y., specifically for locker plant freezing.

Sturdier than its predecessors, the improved container has the same moisture-proof, non-absorbent qualities. In addition, a plastic-sealed-in bottom has been developed.

One of the reasons for its popularity is the simplicity with which it is packed and emptied. There is nothing to filling the container but putting in the food and slipping on the cover. Directions on the cover show how easy it is to peel off the sidewall of the container to remove the frozen food.

The containers are made in pint, quart and 5-lb. sizes.

Meat Substitute

THE UNIVERSITY OF ARKANSAS RESEARCH FOUNDATION has negotiated a contract with the Wentworth Canning Co., Ltd., Hamilton, Ont., granting that company Canadian rights for the manufacture of a new low-cost dairy food. The new food has a protein content approximately that of lean beef. It is composed largely of various milk solids, supplemented with food yeast, fat, iron and calcium. It is also vitamin enriched.

The new food has been successfully canned on a pilot plant scale in six different forms. Canned in its basic form, it may be used in

A NEW WRAPPING MACHINE BY "PACKAGE"

You'll see it in operation at the

PACKAGING EXPOSITION

BOOTH 104
CLEVELAND AUDITORIUM
APRIL 26-30

Embodies the most modern ideas in wrapping machine design

Leading package goods manufacturers have come to rely on "PACKAGE" for the latest and finest in wrapping machines. That's why we believe you'll want to see this new model which we are unveiling at the Show.

It's the result of many months of study and designing by our engineering staff . . . Simple, compact, easy to operate—*yet extremely versatile* . . . Handles cartons, goods in open boats, trays, etc. . . . Quickly adjustable for a wide size range . . . Can be equipped to print labels and seal them to the tops of packages.

While at our Booth, you'll also learn about other new developments in packaging, and have an opportunity to discuss any packaging problem you may have with our sales and engineering staff.

So make a note now to visit us—Booth 104.

PACKAGE MACHINERY COMPANY
Springfield 7, Massachusetts

NEW YORK CHICAGO CLEVELAND ATLANTA DENVER
LOS ANGELES SAN FRANCISCO SEATTLE TORONTO

PACKAGE MACHINERY COMPANY
Over a Quarter Billion Packages per day are wrapped on our Machines

Test your knowledge of what food customers want

1 How many customers say glass containers give them more advantages than other containers?

- ☐ 2 out of 10
- ☐ 4 out of 10
- ☐ 7 out of 10

7 OUT OF 10. Authority: National consumer survey of packaging preferences.

2 Are women buying

- ☐ more,
- ☐ less, or
- ☐ the same,

amount of baby food in glass?

MORE women are buying baby foods in glass than ever before. And for the same reasons they prefer other foods in glass. A tip for more impulse sales of your product!

3 Is the swing to glass as the favored food container growing?

- ☐ Yes
- ☐ No

"YES!" The number of housewives who say they want to "See before they buy" has doubled since 1939.

4 How many reader-impressions is it possible for this and other Duraglas container advertisements to make during 1948?

- ☐ 100 million
- ☐ 300 million
- ☐ 500 million

500 MILLION! In fact, the swing to glass is being continuously intensified by consumer advertising which is now in its 9th consecutive year.

SCORING

Three or four right . . . you've discovered the profit potential of glass-packed foods. Your future is bright as glass!

Two right . . . you're on the right track, but you better take full advantage of the power of glass to boost sales . . . other packers are!

One or none right . . . you are losing sales to your competition. Pack in glass! Give customers a chance to buy your food the way they want it—in glass!

Duraglas TRADE MARK REG U.S. PAT. OFF.

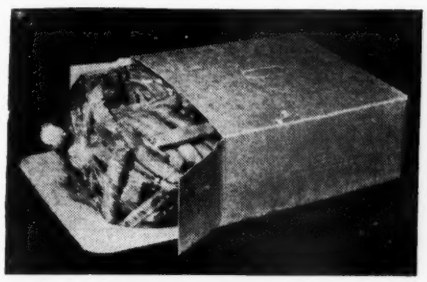
CONTAINERS SELL ON SIGHT

OWENS-ILLINOIS GLASS COMPANY

TOLEDO 1, OHIO • BRANCHES IN PRINCIPAL CITIES

any recipe calling for ground meat. Or it can be sliced, fried in shortening, and used in sandwiches. It has also been canned in ready-to-eat: (1) Dairy loaves of differing composition to meet various income levels, (2) dairy balls in Spanish sauce and spaghetti, (3) croquettes in sauce, (4) ravioli and (5) tamales.

The dairy loaves and the dairy balls have a distinct meaty taste. It is reported that the taste of ravioli and tamales prepared with the new product is difficult to distinguish from the same foods prepared with meat.



For Frozen Foods

LINDLEY BOX & PAPER CO., Marion, Ind., in cooperation with Shellmar Products Corp., Mt. Vernon, Ohio, have placed on the market a new frozen food package. This package consists of the old established Lindley Locker-Pak in combination with Shellene inner-bags.

Shellene is a clear, strong, flexible plastic film that will not crack, break or fracture at —50 deg. F. It can be washed in hot water and used in the same manner as a glass jar. The material has a vapor transmission rate of 0.6 g. per 100 sq. in. on 0.002 gage stock at 70 deg. F. and 35 percent humidity. Air-tight closure of the inner-bag is made by twisting the open end tightly, looping it over into a "goose-neck," and banding the middle of the loop securely with a rubber band.

Candy-In-Parts

PARTY PACK, a multiple unit package developed by Sylvania Div. American Viscose Corp., is suggested to the candy industry as an attractive sales-building display item for candy counters. It is used to package together nuts, gum drops and hard candies in a six-in-one box.

The package is wrapped in moisture-proof heat-sealing Cellophane to keep the confections fresh and at the same time display them in their taste-rousing colors.

● By the very nature of their service, check valves *must be* dependable. That Lunkenheimer Check Valves provide this service is proved by innumerable installations, in plants large and small.

Let's consider, for example, the Lunkenheimer Swing Check Valve. Among other features, every Lunkenheimer Swing Check Valve is equipped with *two* renewable side plugs. Normal carrier pin wear can be compensated for easily. Recognized by leading valve users as remarkably trouble-free, Lunkenheimer Check Valves provide positive reverse-flow protection over a much longer, lower-cost service life.

Your Lunkenheimer Distributor has a stock of Check Valves for your needs. Call on him for your original equipment, replacement, and repair valve requirements.

. . . More than 96 types of LUNKENHEIMER *Check Valves*

Available in sizes and materials to meet every service requirement.

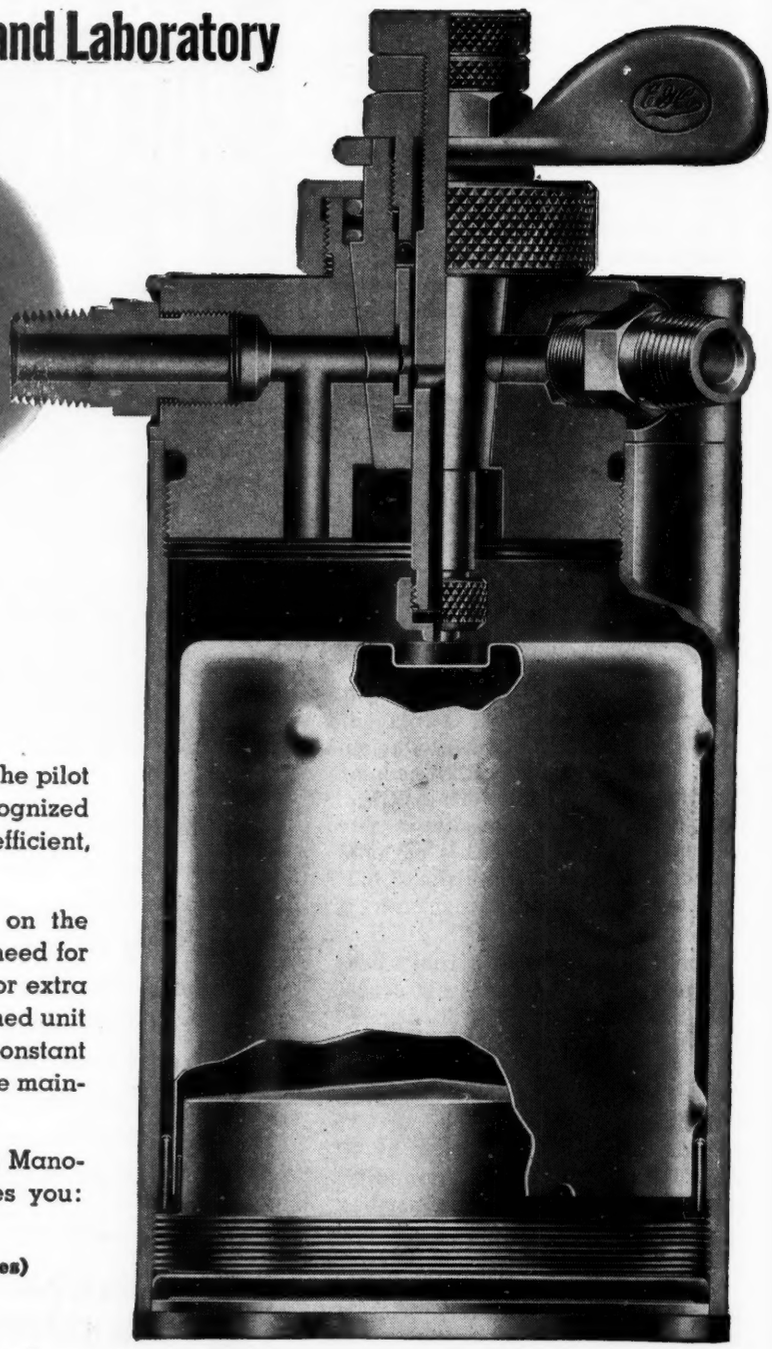
From small Bronze 125 lb. S.P. to massive steel patterns for pressures up to 2500 lb. S.P.

Lunkenheimer Check Valves are described and illustrated in Circular Number 588. Ask your Distributor for a copy or write direct.

ESTABLISHED 1862
THE LUNKENHEIMER CO.
"QUALITY"
CINCINNATI 14, OHIO. U. S. A.
NEW YORK 13 CHICAGO 6
BOSTON 10 PHILADELPHIA 34
EXPORT DEPT. 318-322 HUDSON ST., NEW YORK 13, N. Y.

Automatic
Vacuum and Pressure Control
for Industry, Pilot Plant and Laboratory

Based on a Principle Never Before Used in Industry!



- **So simple anyone can operate it!**
- **Just set it and forget it!**
- **Slashes operating costs!**

TESTED in the laboratory and successful in the pilot plant, our new Cartesian Manostat is recognized by industry as *the* answer to the problem of efficient, effortless and economical pressure control.

Completely automatic, this Manostat works on the physical principle of the Cartesian Diver. No need for complicated electrical or mechanical systems or extra equipment of any kind. Just put this self-contained unit in your system—SET IT AND FORGET IT. A constant pressure or vacuum to within 1/10 to 1% can be maintained with this heavy duty, all metal unit.

Incorporating all the advantages of our Glass Manostat, this revolutionary Model No. 5 also gives you:

1—Larger Capacity
2—Wider Range (supplied with 3 interchangeable orifices)
3—Higher Sensitivity
4—Greater Flexibility
5—Control of both Pressure and Vacuum
6—Simplified Operation
7—Fool-Proof Design
8—Stainless and Chrome Steel
9—Low Price

For complete information, including performance and operating data, write for Bulletin ICM-96.

CARTESIAN MANOSTAT
TRADE MARK

MODEL No. 5 (INDUSTRIAL)
PATENT PENDING

Complete with 3 Interchangeable orifices and mercury, $95.00.
Size: 7½" overall. Diameter: 3¼". Weight: approximately 8 lbs.

The EMIL GREINER Co.
161 SIXTH AVENUE NEW YORK 13, N. Y.

Branch Offices:
112 Broadway, Cambridge, Mass. 2127 Fourth St. Berkeley 2, Calif.
90 State Street, Albany 7, N. Y.

FOOD INDUSTRY NEWS

GENERAL

Lower Costs To Be Discussed At AMA Packaging Conference

FOR the first time since the war strong emphasis will be placed on lowering costs through improved packaging, at the American Management Association Conference on Packaging, Packing and Shipping to be held in Cleveland on April 26th through 30th. Economy of production, intensified sales appeal and greater consumer convenience will be among the subjects reviewed for lowering costs.

Discussions at the conference will be directed toward new uses of glass, metals, paper, paperboard and wood for packing and shipping products of all types and sizes. These discussions will also emphasize: (1) Improved warehousing methods and technics, (2) packaging of produce, (3) effective and economical methods of printing, (4) maintenance of packaging machinery, (5) simplification of packing specifications, (6) interior packing, (7) heat labeling and (8) prevention of damage in transit.

Concurrent with the conference, the American Management Association Exposition, expected to draw an attendance of more than 15,000, will be held. At the exposition about 200 exhibitors will utilize 100,000 sq. ft. in the Public Auditorium in Cleveland to display packaging materials, machinery, equipment, designs and services.

For the first time in its history, the show will run five days instead of four. The conference and exposition schedules will be staggered.

Subjects at the Conferences

Two of the four conference sessions will be directed to the interest of package users. These sessions will be devoted to clinics on shipping containers and consumer packaging. At the shipping container clinic, new applications will be demonstrated by W. R. Humel, Western Electric Co., on cushioning materials, interior packing and the utility and economic aspects of container design. Actual containers will be displayed and their advantages and disadvantages will be pointed out.

At the clinic on consumer packaging, emphasis will be placed on noteworthy applications for metal containers, glass jars and bottles, folding and set-up boxes and plastic materials.

The remaining two sessions will cover special treatments on nine aspects of the packaging field. One session, for production men, will be on production and warehousing of packaging material. The other session, for the dealer, will cover the merchandising aspects of packaged goods.

New Equipment and Materials

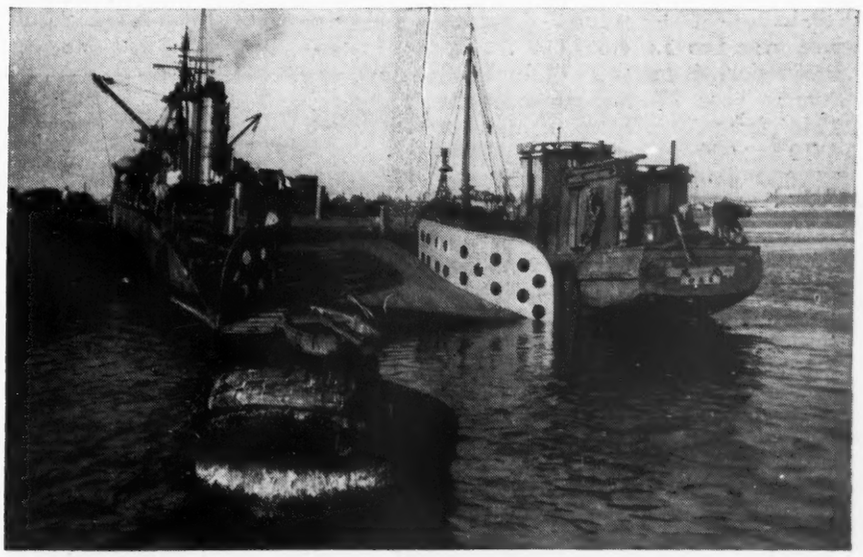
The package-using industries will find new packaging materials, new uses for these materials, new machinery and equipment. Some new films for the protective packaging of food products will be introduced by the Goodyear Tire and Rubber Co., Inc., Akron, Ohio, in Booth 402. Several new uses of Saran 517 film for food packaging will be exhibited by Dow Chemical Co., Midland, Mich., in Booth 121. A new ink which is particularly adaptable for printing cartons, folding boxes and similar packages will be shown by Sun Chemical Corp., New York, in Booth 216-A. New tapes and machinery for using tapes in packaging will be displayed by Minnesota Mining and Manufacturing Co., St. Paul, Minn., in Booth 624.

Four new packaging machines will be introduced by General Mills, Inc., Minneapolis, Minn., in Booth 33. These machines are the General Mills Unipak Filler, the General Mills Ice Cream Carton Setup Machine, the General Mills Ice Cream Carton Filler Machine and the General Mills Ice Cream Carton Closer Machine.

Sealing Machine

A new heat seal automatic labeling machine will be exhibited by Oliver Machinery Co., Grand Rapids, Mich., in Booth 404-A. New models of Amsco Hi-Speed Rotary Bag Sealing Machine, Simplex Hi-Speed Automatic Bag Maker and Corley-Miller Model MPS Heavy Duty Wrapping Machine will be on display by Miller Wrapping & Sealing Machine Co., Chicago, Ill.

In Booth 215-A, a new series of more nearly automatic CECO Adjustable Carton Glue Sealing Machines, known as Model 40, will be demonstrated by Container Equipment Corp., Newark, N. J. An automatic wrapper for candy pops will be displayed in Booth 5-6 by Wrap-Ade Machine Co., Inc. Roto Bag Machine Corp., N. Y. C., plans to introduce a new model Roto Bag Machine in Booth 615.



JAPANESE WHALING SHIP *Authenticated News*

Japan's need for food won them permission to renew whaling operations. This factory ship is ready to leave Tokyo for its first of an expected 300 whale catch.

$100 for Best Article On Reducing Costs

FOOD INDUSTRIES announces a new prize article contest. If you can tell how a food plant recently applied modern methods to reduce operating costs, you are eligible. The author of the best article submitted will receive $100. Second best article will be worth $75, and third best, $50. Articles not winning a prize will be considered for publication at usual rates.

Your article should tell in about 2,000 words what your problem was, what method you applied to get your costs down, and how successful you were. Good pictures suitable for reproduction and actual operating data on the process are highly desirable.

The editors of FOOD INDUSTRIES will judge the articles, which should be submitted on or before April 15, 1948. Winners will be notified as soon as possible after the contest closes. . .Timeliness and general interest of the material will guide the editors in selecting the articles and in scheduling them for publication. The articles must be written exclusively for FOOD INDUSTRIES. Those ineligible for prizes or publication will be returned on request at the close of the contest.

Candy Sales Approach Billion Dollar Mark

PRELIMINARY estimates made by the Department of Commerce indicate 1947 total candy sales of all manufacturers in the country approximated $930,000,000 as compared with the 1946 high of $687,000,000. Sales in pounds for 1947, as reported by 121 cooperating confectionery manufacturers, amounted to 1,500,503,000 lb., a 6 percent rise over the 1,414,861,000 lb. figure reported in 1946. The dollar volume rose 37 percent over the 1946 figure, reaching a high of $519,542,000, as compared to $378-235,000 volume done in 1946 by these 121 concerns.

Men eat more candy bars than women, but girls out-eat the boys, according to another survey recently completed by students of the University of Notre Dame on the candy eating habits of the people of South Bend, Ind. The results show that 92 percent of the men, 89 percent of the women, 99 percent of the girls, and 97 percent of the boys are candy bar addicts.

Projecting the results of this survey, 24 percent of the population eat a candy bar each day; 46 percent eat from one to five a week; 20 percent eat a candy bar occasionally; and 10 percent fall into the "infrequent eater" category.

This comprehensive survey also revealed the nickel bar to be most universally popular and the 10-cent bar to be generally considered as "too much for too little."

Airline Foods Show Steady Development

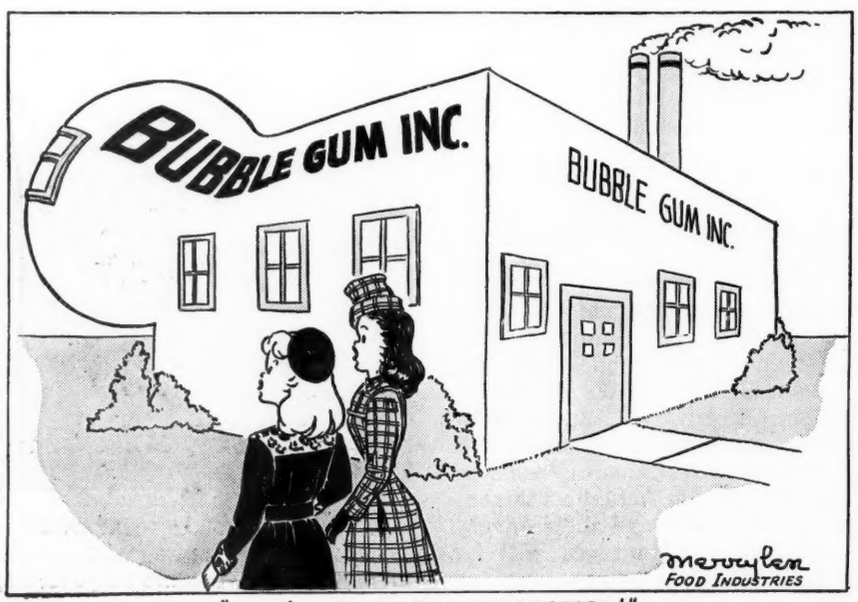
CONSOLIDATED net sales of $10,575,127 are reported by Airline Foods Corp., in the first half of the fiscal year, ending December 31. Net profit for the six months, after provision for federal income tax, was $116,835. Comparable figures in 1946 are not available due to changes in accounting periods of acquisitions. The company's consolidated current assets, on December 31, were placed at $6,737,479 and current liabilities $2,957,981.

The name Airline Foods is relatively new to the food industries. The companies making up the corporation, however, are for the most part long-established food organizations. Controlled by the brothers Jerome and Milton S. Jennings, the corporation springs from their purchase of R. S. Wallace and Co., food distributors, in 1926. Five years later, Burton and Davis Co., food exporters and importers, was brought into the field and the company reorganized as Wallace, Burton, Davis and Co. The first manufacting firm was added in 1935 when the then 41-year-old Max Ams Co., manufacturers of preserves and other food specialties, was acquired. Lippincott Fine Foods, another food specialty importer and manufacturer, entered the picture, in 1942, as a result of the purchase of the assets of the Lippincott Fine Food Co., Cincinnati.

Another manufacturer of jams, jellies and other specialties entered the group in 1943, when Goodwin Preserving Co. was taken over by the brothers. A year later, the first expansion into another branch of the industry was made when Ouerbacker Coffee Co., Louisville, Ky., was acquired. Thereafter, in rapid succession, came Atlantic Macaroni Co., which became Caruso Foods, Inc.; Empire Biscuit Co.; Henri Foods Inc.; David G. Evans Coffee Co., which has absorbed Ouerbacker; San Jose Packing Co., canners of fruit and fruit juices, which uses the name Chevy Chase Co.; Smithfield's Pure Food Company, Inc. and Richard Frank Co. In addition, another wholesale distributor, Herman Kussy, was bought and joined with the Richard Frank Co. to form the Herrman Co. Another company, James A. Harper Supply was bought and merged with David G. Evans during this period.

Doubtful Wheat Crop Indicated By Reports

RECENT optimistic reports on the 1948 wheat crop prospects are highly premature in the opinion of farm and industry leaders in the growing areas. They point to the heavy drain made by the 1947 crop upon the residual moisture content of the subsoil, which had carried over from 1946. Then there was the extremely deficient rainfall in the wheat growing areas, last summer and fall. As a result, some estimates put the combined winter



"THAT'S THE TESTING LABORATORY!"

and spring crop at as much as 25 percent below the recent five-year average. This, they agree, envisions the very worst prospect, but it is based on realistic grounds.

The dry period, for one thing, continued until late November in some areas and right into December in others. This necessitated extremely late sowing by those farmers who waited until there was some moisture in the topsoil. What early sowing there was, was done mostly in dry, dust-like topsoil with no sprouting until the rains and snows in late November and December provided the necessary moisture. These conditions have brought about shallow rooting of the wheat plants. The downward growth of the roots was stopped by the strata of dry soil that was only a few inches from the top of the ground.

Under ordinary conditions, when there is plenty of topsoil and subsoil moisture, the rooting of the wheat plant extends from 30 in. to considerably greater depths, during the winter months. This rooting is necessary to assure maturity of the plant and the filling out of the grain head and kernels during the usually dry period preceding harvest.

While there has been an unusual amount of snow in the extensive growing areas of Nebraska, Kansas, Oklahoma, Texas and Colorado, there has been no more than enough to protect the seedling plants against freezing damage and to supply some moisture to the topsoil.

Reliable though unofficial preliminary reports indicate that more than 1,000,000 planted acres have already been abandoned in the areas of eastern Colorado and western Kansas and Nebraska. The same reports estimate that at least another 5,000,000 planted wheat acres are likely to be abandoned in the western third of Kansas and Nebraska and in eastern Colorado.

Dairy Conference

ANNOUNCEMENT of the 1948 summer conference of the National Dairy Council, to be held June 14 to 16, at the Edgewater Beach Hotel, Chicago, was made by Milton Hult, president of the council, from headquarters in Chicago. The conference program will be built around latest trends and conditions that exist in the dairy industry today, and will include speakers who are authorities in the fields of nutrition, research and education.

NO OTHER STRAINER
YARWAY
IRON
OFFERS ALL THESE ADVANTAGES
A good strainer protects your equipment and pipelines. Yarway gives you a better strainer to "police your pipelines".
FIRST—The Screen is a high-grade woven monel wire basket that catches solids, lets condensate, oil or other fluids flow freely. Perforated screens if desired.
SECOND—Screen cap is made with straight thread, machined face and spark plug gasket, insuring tight joint. Screen comes out with cap for easy cleaning . . . automatically aligns when replaced.
THIRD—Iron and steel bodies are cadmium-plated for protection against corrosion and for better appearance.
FOURTH—Available in six sizes, from ½" to 2" for pressures to 600 lbs.
FIFTH—Reasonably priced.
SIXTH—Stocked and sold by 150 Mill Supply Houses. Hundreds of thousands already in use. See your local dealer or write for Bulletin S-201.
YARNALL-WARING COMPANY
127 MERMAID AVENUE PHILADELPHIA 18, PA.
YARWAY STRAINERS
"Police the Pipelines"

DAMP-TEX
ENAMEL
FOR WET
EQUIPMENT
and WALLS
FRIEND
OF THE PLANT
OWNER... WHO HAS
A WET SURFACE
MAINTENANCE PROBLEM
The Damp-Tex system of painting kills rust, rot, fungus and bacteria. Stops deterioration. Can be applied on any paintable surface, wet or dry, with equal ease and efficiency - changing dingy, rough light-blotter interiors into glistening porcelain-like beauty. One coat covers. Resists acid, alkali, corrosive gases and oxidation. Dries overnight without flavor-tainting odor into waterproof film. Comes in white and colors.
Write for our trial offer.
LIQUID PORCELAIN-LIKE
DAMP-TEX FOR
WET
OR DRY SURFACES
STEELCOTE MFG. CO.
ST. LOUIS 3, MO.
Canadian Manufacturer:
Standard Paint & Varnish Co.,
Windsor, Canada

SPRAYS UREA AND MOLASSES

Cattle follow a Food Machinery pressure sprayer distributing a mixture of molasses and urea on grain stubble, in California. It is hailed as a new grain saver.

Propose R&MA Listing Of All Food Research

THE National Advisory Committee to the Administrator of the Research and Marketing Act has proposed that R&MA officials study the possibility of setting up a continuing catalog—an authoritative, complete, and current listing — of all research now being conducted that affects agriculture and food.

Such a project, it is suggested, would contain a listing of all research, whether sponsored by the Department of Agriculture and state governments or by universities, private companies, organizations, etc. It would be similar to the project already under way at the National Research Council (FOOD INDUSTRIES, Sept. 1947, p. 121) except that the proposed project would attempt to cover a broader field. It would include many research projects beyond the scope of the catalog.

This research roster project was one of the main subjects of discussion at the meeting of the National Advisory group, last month. Research and marketing authorities agreed to study the proposal, and to be prepared to discuss the project in more detail with the Advisory Committee at its next meeting, April 15 and 16.

The advisory group suggested that such a research index might itself be a Research and Marketing Act project, and they also suggested that it be considered as one that might well be assigned to some outside private organization.

During the meeting the advisory group decided that it would present at its April meeting its own recommendations for the R&MA research program during the year beginning next June 30. E. A. Meyer, administrator of the act, has already appeared before appropriations committees on Capitol Hill to justify the R&MA $19,000,000 budget request for the coming fiscal year. It's believed that the recommendations of the National Advisory Committee, which is set up by law, will be helpful in keeping the program from spreading out into projects not directly concerned with finding new markets and new methods of expanding present markets for farm products.

This problem of proving to Congress that R&MA needs are not just "added on" to the regular appropriations for the old-line agriculture research administration is a major one. Congress passed the Research and Marketing Act to do research that the regular ARA research bureaus are not set up to do, but R&MA officials have felt the pressure nevertheless from the ARA research bureaus to "get their fair share" of the R&MA money.

Save Food Through Urban Rat Control

PERMANENT rat control centers, to save food waste, are now being established by the National Committee for Rat Control. The group is headed by H. M. Warren, National Carbon Co., and includes industrial and business executives.

Emergency food conservation funds have been made available for rat control to the Fish and Wildlife Service in the Department of Interior. These funds are sufficient only for an intensive two-month campaign to arouse the public to the necessity for rat control. After that, each city should be in a position to carry on its own campaign of rat extermination effectively and continuously. All Citizens should know that the mainte-

nance of rat control is a necessary permanent activity. There is an estimated rat population of over 150,000,000 in the U. S. doing a yearly damage over $2,000,000,000, and destroying 4 percent of the annual grain production.

Working together, the National Committee for Rat Control and the Fish and Wildlife Service are preparing materials to help localities fight rats. Secretary of the Interior Krug has sent personal letters to all Mayors of cities over 10,000 inviting them to join the war on rats. Each city was requested to appoint a local rat chairman to organize rat-control units adequately financed and staffed for work. Mats, posters, and helpful literature have been sent to the selected chairmen.

USDA Citrus Buying Totals $6,000,000

PRODUCTION AND MARKETING ADMINSTRATION officials completed one canned citrus buying program last month and began another. The total added up to $6,000,000 in USDA citrus purchases.

About complete was a $3,500,000 purchasing program on canned single-strength unsweetened and sweetened grapefruit juice for school lunches and institutions. Closing date for the last set of bids was March 8, for delivery up to April 5.

Just started was a program to buy $2,500,000 worth of concentrated grapefruit juice. It was generally conceded that the purchases were for the interim aid program of European relief.

The announcement set three cut-off dates for bids, the last being "on or before March 29 for acceptance March 31 and delivery April 10 to May 15."

Food Labor

THE food and kindred products industries ranked first in the amount of business given to the National Labor Relations Board during the last year of the Wagner Act.

NLRB received 1,561 cases, or 10.5 percent of its total, from this industry. They were split into 1,114 election cases and 447 unfair labor practice charges.

NLRB conducted 613 elections and payroll cross-checks during the year among food employers. Unions lost more than a fourth, or 170 of them. The AFL won 266, the CIO 132 and independent unions 45.

There were 80,291 votes cast of a possible 93,135.

We're proud of our new baby—and you're going to be just as enthusiastic, too. The newest GLOBE product—STITCHED CANVAS BELTING—is a husky youngster, already prepared to give you perfect performance on many of your elevating, conveying and transmission needs.

Backed by the GLOBE reputation STITCHED CANVAS BELTING manufacture and applications are under direct supervision of a man whose knowledge and experience in this field is outstanding. Inquiries are invited.

Other GLOBE products (for practically every need of industry) include:

KANRY-TEX: the superior belting for food processors.

SOLID WOVEN WHITE COTTON: "tops" for light conveying.

ENDLESS WOVEN: for grinders, drill presses, and other high speed tools.

CELLULOSE COATED: for bakery and candy manufacturers.

GLOBE WOVEN BELTING CO.
1403 CLINTON STREET
BUFFALO 6, N.Y.

GLOBE line of Woven Beltings. Write for full particulars.

Like Real

OLD FASHIONED

SERVICE?

We have over
800 people
to *serve* you!

Drake OWNER-MANAGEMENT assures you that this service will always be prompt, courteous. Our personnel strive to make your stay with us a delightful experience in warm hospitality, personal service.

EDWIN L. BRASHEARS
President

the LOOP
and the LAKE
Meet at the

DRAKE

Chicago

THE PROCESSING PICTURE

Research Contracts Made Under R. & M. Act

FLAVOR deterioration and staling of bakery products, and new methods and official standards for measuring the bread-baking quality of wheat will be the subjects of two research projects for which contracts were awarded late in February.

American Institute of Baking will study the bakery products at its Chicago headquarters. Controlled laboratory studies, as well as review of the literature, will be the basis of periodic reports to the Department of Agriculture.

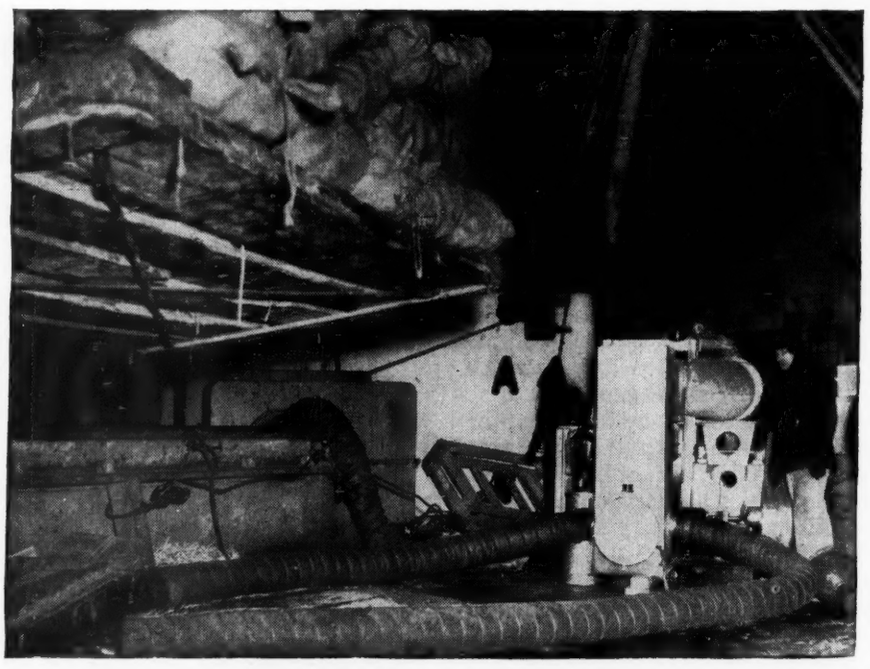
Baking quality of different classes of wheat will be studied by four laboratories in different parts of the country. These include: The Doty Technical Laboratories, of Kansas City, Mo.; the Ingman Laboratories, Minneapolis, Minn.; the Omaha Grain Exchange Laboratories, Inc., of Omaha, Neb.; and the C. J. Patterson Co., of Kansas City, Mo. Present official grain standards do not include bread-baking quality as a factor in determining the grade and classes of wheat. Success of this project would make it possible to pay premiums to farmers who produce better quality wheat and to test the bread-baking quality of new wheat varieties before they are released to growers.

These contracts are among the first to be awarded to agencies outside the federal and state governments. The Research and Marketing Act of 1946 authorizes such contracts when the research can be "carried out more effectively, more rapidly, or at less cost" than by the Department of Agriculture. Both the above projects have been indorsed by the Grain Advisory Committee, made up of representatives of the grain and baking industries.

Propose Grain Saving To Brewers and Bakers

BREWERS are going to go along with conservation program detailed in Federal Register, February 26, page 875. So far, no complaints or arguments have been received, and none are anticipated at agriculture since the program was worked out with the cooperation of the industry.

Secretary Anderson also proposed a "voluntary" agreement for the 12,000 wholesale bakers of bread, rolls, pie, cake and yeast-raised sweet goods, and donuts. Main item in this program is consignment selling. The provision in the Anderson-proposed program for bakers asks that returns of stale bread from retailers should be no more than 1 percent of gross sales in any calendar month.



WARM SHIPLOAD OF POTATOES

Hot air pumped into the ship's holds prevents these potatoes from freezing while enroute to foreign shores. The apparatus was developed by Todd Shipyards Corp.

Bakers ask: What can Anderson do next? He'll get very little response from the invitation attached to the program as printed in the Federal Register — that is, few bakers will write in to state whether they favor or oppose the proposed voluntary program.

This puts the Department of Agriculture on the spot. They won't have any way of proving whether or not they have a voluntary program in effect. They will know, however, that they do not have much acceptance.

The Trade Associations of the baking industry are not taking a stand: They're leary of the anti-trust laws. Anderson's next step may be to put the situation before Congress as he has done with the liquor industry. That is, he will report that he has tried to put across a voluntary grain conservation plan, but has not succeeded. He can leave it up to Congress to decide whether or not they want to enact legislation.

Beech-Nut Subscribes To Chicago Institute

BEECH-NUT PACKING CO., Canajoharie, N. Y., recently became a member of the University of Chicago's Institute of Radiobiology and Biophysics by subscribing $20,000 a year for five years. As a member of the Institute, the company will have access to scientific reports three to six months before publication, and will have an "inside track" on ideas that may become patentable. Member of the company's research staff will meet with the Institute's staff during quarterly conferences.

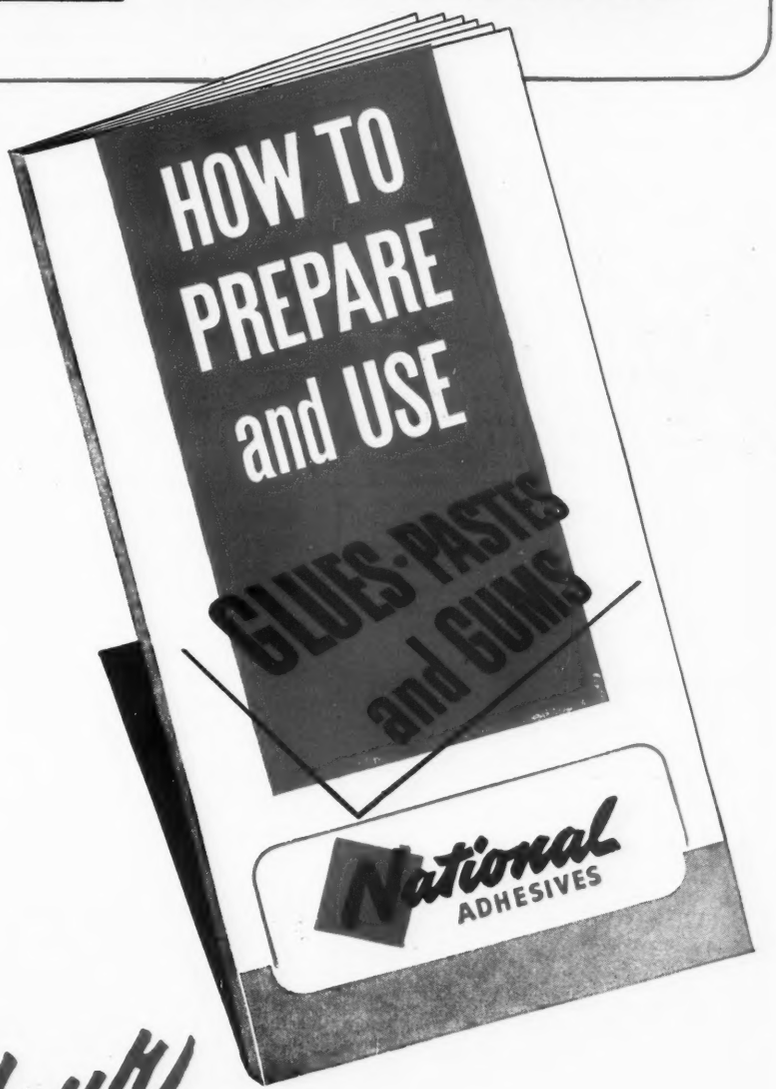
Beech-Nut, in the opinion of Chancellor Robert M. Hutchins, becomes the first representative of the food industry to invest in the belief that radiobiology and biophysics will aid in growing better food products and in processing them more efficiently.

New Flour Developed At Washington State

DEVELOPMENT of a new experimental flour, which utilizes the entire wheat berry without the loss of any constituents, and apparently does not become rancid upon storage, has been announced by Dr. W. A. Pearl, director of the Washington State Institute of Technology.

By the use of a new technic, and machinery designed by research men at the institute, 100 lb. of

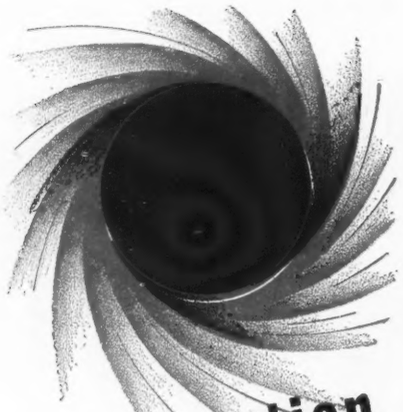
NEW FREE HANDBOOK



Your Copy is Ready

ADDRESS: 270 Madison Avenue, NEW YORK 16; 3641 So. Washtenaw Ave., CHICAGO 32; 735 Battery Street, SAN FRANCISCO 11; and other principal cities. IN CANADA: Meredith, Simmons & Co., Ltd., Toronto. IN ENGLAND: National Adhesives, Ltd., Slough.

EVERY TYPE OF ADHESIVE FOR EVERY INDUSTRIAL USE



lubrication at terrific speeds

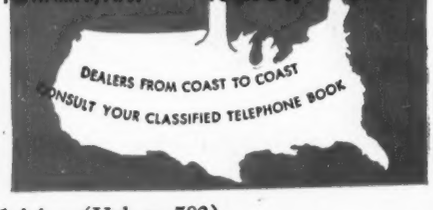
Operation speeds of many production machines have reached an all time high. Speeds above 25,000 R.P.M. are common today. There are LUBRIPLATE lubricants especially well adapted for high speed use. They reduce friction to a minimum, arrest progressive wear and protect against rust and corrosion. There is a LUBRIPLATE lubricant for every need regardless of operating conditions. Write for particulars.

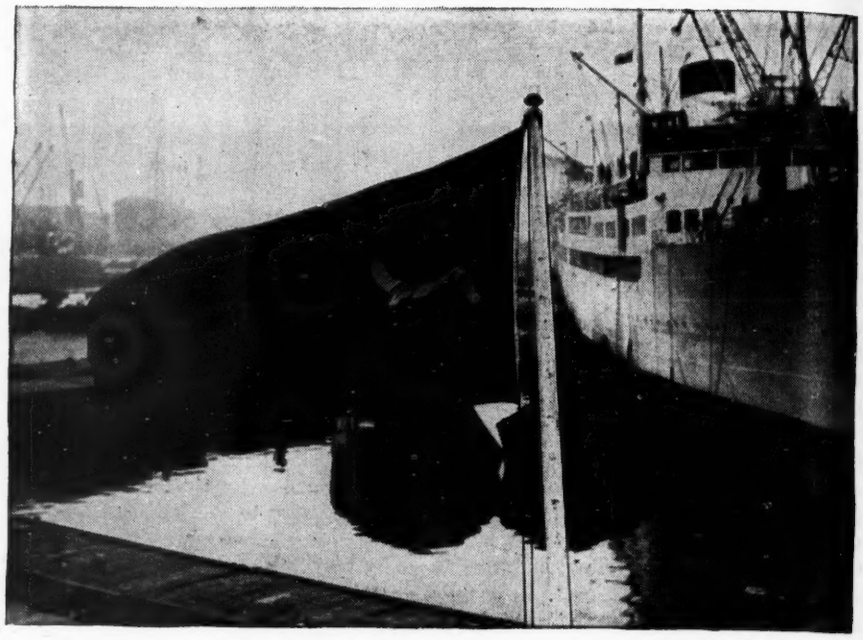
LUBRIPLATE
Lubricants definitely reduce friction and wear to a minimum. They lower power costs and prolong the life of equipment to an infinitely greater degree. LUBRIPLATE arrests progressive wear.

LUBRIPLATE
Lubricants protect machine parts against the destructive action of rust and corrosion. This feature alone puts LUBRIPLATE far out in front of conventional lubricants.

LUBRIPLATE
Lubricants are extremely economical for reason that they possess very long life and "stay-put" properties. A little LUBRIPLATE goes a long way.

LUBRIPLATE
FISKE BROTHERS REFINING CO.
NEWARK 5, N. J. TOLEDO 3, OHIO





British Combine

RUSSIAN FLAG IN ENGLAND

The first shipment of maize to reach England from Russia, under the recent Anglo-Russian trade agreement, is celebrated by the flying of Red flag at British dock.

clean wheat is said to yield 100 lb. of finely ground whole wheat flour. The customary screening out of bran, shorts and wheat germ is eliminated. Low grade Turkey Red wheat, of only 11.7 percent protein content, has been ground on the high-speed wheel and found to yield good bread. Until now, it was believed that a protein content of at least 15 percent was required to make whole wheat bread.

The test flour has been stored for months under various conditions and remained sweet. This keeping quality is attributed to the extreme fineness of the flour and to its vitamin E content, which is removed in other processes. Experiments on using this new flour in muffins, cookies of several types, quick breads, pie crust and yeast breads are being conducted in the college of home economics.

Begin Cheddar Output At Kraft's New Plant

PRODUCTION of the new type Kraft Cheddar cheese was increased recently, when a third Kraft-owned Minnesota cheese factory began Cheddar operations in Hutchinson, Minn., in addition to those at Watkins and Melrose. Another plant owned by the company in Fayetteville, Tenn., has also just started Cheddar production. The Cheddar product, marketed nationally by the company for over a year, is manufactured in 10 lb. "bars," has neither paraffin or cheese cloth wrapping, virtually no rind, and is packaged in its own transparent wrapper at the factory.

An estimated annual requirement of 100,000,000 lb. of milk will be needed to meet the increased Cheddar production in the state, according to George Pfeifer, assistant general manager of the Northern Division, Kraft Foods Co.

ACS Food Talks

RECENT advances in food technology will be among the subjects discussed at the 113th national meeting of the American Chemical Society, in Chicago, April 19 to 23. New canning and packaging technics that will enhance the flavor and nutritive value of processed foods will be described at a symposium, sponsored jointly by the division of agricultural chemistry and the division of industrial and engineering chemistry. Dr. Albert L. Elder, research director of the Corn Products Refining Co., will preside.

Milling Course

FORTY-FIVE millers from 20 states attended the short course in fundamentals of milling, mill sanitation and drawing, held at Kansas State College, Manhattan, Kan. The one-month course, organized by the college milling department, under Dr. J. A. Shellenberger, was offered at the request of the milling industry and included discussions on milling technics and operations by representative speakers from the industry.

Maryland Processors Discuss Pollution

MARYLAND food processors are looking forward to cooperative relations with the state's new water pollution control commission. More than 300 food packers attending the Tri-State Packers Association meeting in Baltimore last month had their first opportunity to discuss pollution problems with the commission's representatives. They left with the impression that the commission would be expected to be reasonable in pursuing its objective.

The commission, which was organized last year following passage of pollution-control legislation by the Maryland legislature, has only recently had its representatives out in the field. A number of food processors have demonstrated their confidence in the methods of the new commission by voluntarily requesting that its field representatives visit their plants in order to survey the pollution problem and offer their suggestions.

Baking School

AMERICAN INSTITUTE OF BAKING, Chicago, is continuing with its program of short courses in baking practice and bakery sanitation. With the completion of its recent three-week course on pie baking other courses were undertaken in cake baking, bakery sanitation, and retail baking. To accommodate the large number of students who planned to enroll in the course on retail baking, the institute scheduled an additional retail baking course, which was held from Feb. 29-Mar. 13. Graduates of each course have been awarded Certificates of Graduation by the institute.

DISTRIBUTION

USDA Announces Winter Pear Diversion Program

A PROGRAM designed to encourage domestic consumption of designated varieties of winter pears produced in Washington, Oregon, and California, has been announced by the U. S. Dept. of Agriculture.

Payments of 45 cents per box will be made to shippers for specified varieties of pears diverted from normal trade channels to the domestic diversion markets in North Dakota, South Dakota, Min-

pick the one that's MADE FOR THE JOB!

CHOOSE the cleaning compounds best suited to your particular needs from the *complete* Wyandotte line.

For general cleaning of all types of food-processing equipment, ***Wyandotte G.L.X.**** is safe, speedy and economical. It makes water wetter . . . cleans and rinses thoroughly . . . leaves stainless steel, glass, Monel metal and other surfaces film-free and bright.

Wyandotte S.R.-10 removes stains and scale deposits from equipment easily, completely.

Wyandotte Citrifoam is designed for washing fresh fruits and vegetables. It is free-rinsing and ignores hard water.

As a final rinse or spray for all equipment, after cleaning, ***Wyandotte Steri-Chlor**** gives fast, positive germicidal protection without harming metals, clothing or the skin of those who use it. It makes an excellent germicidal rinse for workers' hands. Steri-Chlor leaves no taste or odor after use.

Whatever your cleaning problems may be, whatever the water conditions in your locality, there's a Wyandotte Product that's especially *made for the job.* Your Wyandotte Representative will be glad to tell you more about these specialized compounds. Why not call him today?

**Registered trade-mark*

Wyandotte
REG. U. S. PAT. OFF.

WYANDOTTE CHEMICALS CORPORATION
WYANDOTTE, MICHIGAN • SERVICE REPRESENTATIVES IN 88 CITIES

The Sign of COMPLETE LABORATORY SERVICE

PRODUCT DEVELOPMENT
PRODUCT TESTING
Foods, drugs, and cosmetics. A well-equipped laboratory under supervision of highly trained and experienced personnel. Hormone assays and research; toxicity tests; pharmacological research; and related problems.

FOOD ANALYSES
Comprehensive research in foods and nutrition; vitamin assays by biological, microbiological, chemical, and spectrophotometric methods. Staff includes bacteriologists, biologists, chemists.

BACTERIOLOGICAL STUDIES
CONSULTATION
Literature upon request

LEBERCO LABORATORIES
123 HAWTHORNE STREET
ROSELLE PARK, N. J.

When executives go back to school...

Conduct your meetings, banquets, lectures, forums and classes at the convenient Hotel Berkeley-Carteret in Asbury Park. All facilities and service for meetings from 10 to 600. Only 90 minutes from Times Square . . . yet free from interruptions and distractions.

Reasonable rates on request. Write or phone Asbury Park 2-5000.

HOTEL
BERKELEY-CARTERET
on the Ocean at Asbury Park, N. J.

nesota, Nebraska, Iowa, Kansas, Missouri, Oklahoma, Arkansas, Texas, Louisiana, Tennessee, Mississippi, Alabama, Florida, Georgia, South Carolina, and North Carolina.

Under the program, payments on the Buerre D'Anjou and Doyenne du Comice varieties are limited to pears of the U. S. No. 2 grade of 180 and larger sizes, and on Winter Nelis, to pears of the U. S. No. 1 grade of sizes 195 and larger.

1947 production of pears in these three states was estimated at a record of over 5,800,000 boxes. This amounts to 38 percent more than the average annual production during the five seasons ending last year. Before the war about 40 percent of the pears were exported to foreign countries.

Margarine Producers Ready For Showdown

MARGARINE manufacturers appear headed for a showdown in their fight to eliminate federal taxes and fees on their product. Agreement by Rep. Clifford R. Hope, chairman of the House Agriculture Committee, to hold hearings on the bill introduced by Rep. Robert J. Corbett (Rep., Pa.) opened up the bottleneck in which so many similar bills have been previously caught. It has been the house agriculture committee, for the most part, that has blocked these bills in past years by letting them die on the committee table, with approval of the powerful dairy bloc.

This year, however, the margarine people have lined up powerful backing of their own. The newly developed soybean and cottonseed group brings many midwestern and southern congressmen into the fight on margarine's side. Most big-city representatives, in response to a consumers' lobby, are also lining up for tax repeal. Add to these a political climate that seems to be right and the high cost of living, symbolized in the popular mind by butter at $1 a pound, and the force looks too powerful for the still strong butter bloc.

Canadian Court Rules Against Ovaltine Ad

A JUDGMENT against the manufacturers of Ovaltine in Canada, was recently handed down in a Toronto court. The decision involved an advertisement published in Canadian daily papers, last May, and which the court found to be "likely to create erroneous impressions regarding the value, composition, or merit of the said food."

Among other statements the advertisement had compared the Vitamin C content of Ovaltine with that of tomatoes, leaving the reader to infer that such a comparison placed Ovaltine among the highest Vitamin C carrying products. The court further objected to the whole general tone of the advertisement.

The decision is regarded as a far reaching one in Canadian food industry as the case was being watched closely as a "test" for most food producers.

Press Association

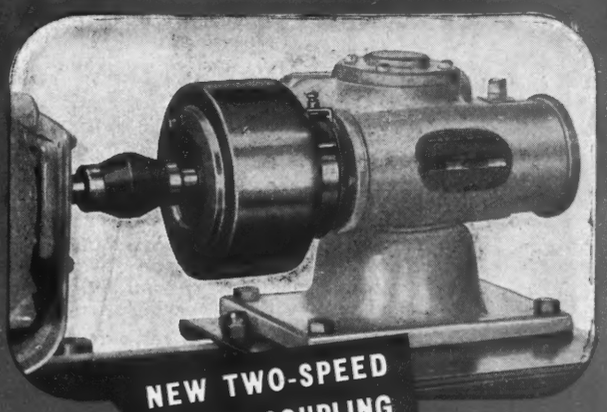
GULLS LIKE THEIR HERRING

These seagulls enjoyed life for a few minutes when a herring fishing boat was left unguarded, off Connecticut. Fishermen have been troubled by raiding gulls.

STERILINE PRESENTS

★ **NEW TWO-SPEED COUPLING**

★ **DIRECT EXPANSION REFRIGERATION COIL**



NEW TWO-SPEED MOTOR COUPLING

DIRECT EXPANSION REFRIGERATION COIL

Look to Steriline for the Newest Improvements in Advanced Pasteurization

Steriline's newest contribution to greater flexibility in dairy products manufacture without increasing equipment investment is the new Steriline Two-Speed Motor Coupling. In a few seconds time you can reduce the normal speed of the agitator to half. This enables you to produce more viscous products such as cheese starter, cottage cheese, buttermilk, Bulgarian buttermilk, and acidophilus buttermilk. The new Steriline Direct Expansion Ammonia Coil provides rapid cooling after pasteurization eliminating additional equipment and cleaning time. For the newest advances in pasteurization, look to Steriline.

*Available as extras.

FOOD PROCESSING MACHINERY CO.

4302 N. Port Washington Road, Milwaukee, Wis.

STERILINE PASTEURIZERS

*THERE'S ONE NEAR YOU

for
• SPRAYING • WASHING • RINSING • COOLING • AIR CONDITIONING

Get the most out of your Spraying Equipment with minimum power with efficient spraying.

Use Yarway Nozzles. No internal vanes or other restrictions to clog or hinder flow. Two types—Yarway Involute-type producing a fine hollow spray with minimum energy loss, and Yarway Fan-type producing a flat fan-shaped spray with time-saving slicing action for cleaning.

Wide range of standard sizes and capacities. Cast or machined from solid bar stock.

Thousands in use. Write for new Bulletin N-616.

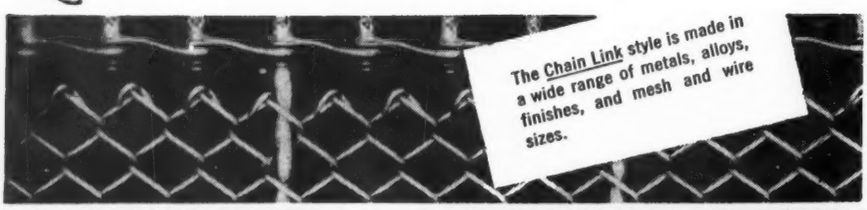
YARWAY SPRAY NOZZLES

YARNALL-WARING COMPANY
127 Mermaid Avenue, Philadelphia 18, Pa.

INVOLUTE-TYPE FOR HOLLOW CONE SPRAY

FAN-TYPE FOR FLAT SLICING SPRAY

Cyclone Metal Conveyor Belts
... tailored to fit your plant



The Flat Wire belt is made in three mesh sizes in stainless steel, galvanized and plain uncoated wire. Flex-Grid is also available.

Cyclone engineers will gladly help you plan an efficient conveyor belt system to fit your particular operating conditions.

FREE Catalog No. 4

By the makers of Cyclone Fence
CYCLONE FENCE DIVISION
(AMERICAN STEEL & WIRE COMPANY)
Dept. H-48, Waukegan, Illinois
United States Steel Export Company, New York

CYCLONE FENCE DIVISION · American Steel & Wire Co.
USS CYCLONE "Red Top" CONVEYOR BELTS
UNITED STATES STEEL

UNITED STATES STEEL

Press Association

OHIO LEMONS

Back porch of his Springfield, O., home is citrus territory for A. E. Currey. One year the tree produced 15 lemons. He is admiring one measuring 12¾ in.

Olive Oil Standard Took Effect March 21

GRADE STANDARDS for olive oil, the first issued by USDA, require that the product be a clarified edible oil. The specific gravity must be between 0.910 and 0.915 at 25 deg. C. The refractive index must be 1.4668 to 1.4683 at 25 deg. C., and the iodine number (Hanus) between 79 and 90. Containers "suitable for the preservation of the product" must be used. Recommended fill of containers is not incorporated in the grades as a factor of quality.

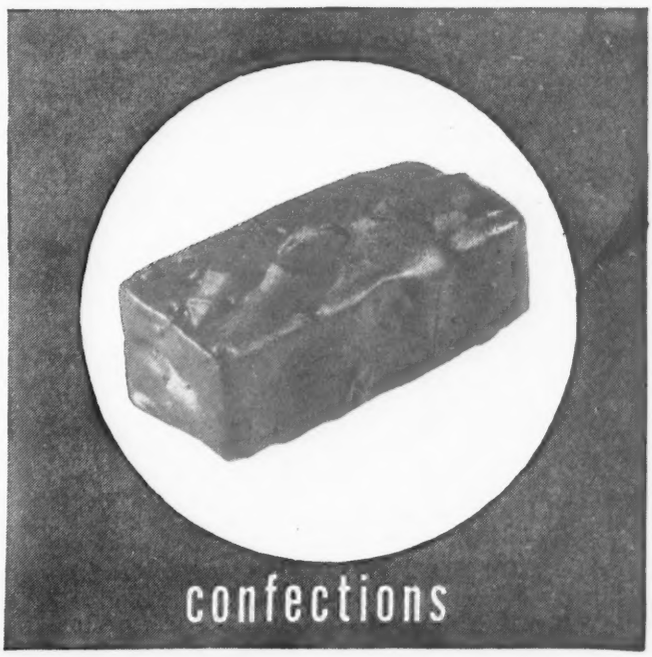
Four grades "A" to "C" are indicated. All except "C" possess "the typical greenish to light yellow color of olive oil." Free fatty acid content ranges from a maximum of 1.4 percent in U. S. Grade A to a maximum of 3 percent in Grade C.

New Service Predicts Livestock Diseases

PREDICTION of when and where livestock diseases will occur in 1948 is a new service available to Texas stockmen through Extension Service, Texas A. & M. College, College Station. Based on the fact that many livestock infectious diseases occur seasonally as well as in specific areas, a study of past reports reveals what may be expected in the future. Thus forewarned, stockmen may take necessary precautions and possibly prevent outbreaks of infections.

In Texas alone, it is anticipated that, unless precautionary mea-

better flavors with ETHAVAN



Flavor manufacturers and processors who have tried Ethavan (Monsanto's Ethyl Vanillin) make it their first choice for all products that call for vanilla flavoring.

This is because Ethavan has the following properties designed to improve flavor formulations:

1. **Distinctive flavor.**
2. **More pronounced aroma.**
3. **Extra staying power at extreme temperatures.**
4. **Added economy (three times stronger than ordinary vanillin).**

Manufacturers who would like additional information and technical data on Ethavan are invited to mail the coupon — or contact the Monsanto District Sales Office in your area. Inquire also about the many applications of Methyl Salicylate, U. S. P., Benzyl Benzoate, U. S. P., Vanillin and Coumarin Monsanto.

Ethavan: Reg. U. S. Pat. Off.

MONSANTO
CHEMICALS — PLASTICS

District Sales Offices:
New York, Chicago, Philadelphia, Boston, Detroit, Cincinnati, Charlotte, Cleveland, Birmingham, Houston, Los Angeles, San Francisco, Seattle. In Canada: Monsanto (Canada) Ltd., Montreal.

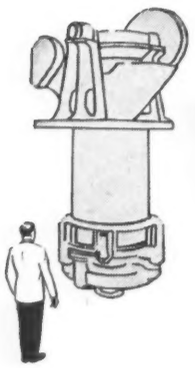
MONSANTO CHEMICAL COMPANY FIO-2
Organic Chemicals Division
1700 South Second Street, St. Louis 4, Missouri
Please send me additional information and technical data on Ethavan.
Name _____ Title _____
Firm _____
Address _____
City _____ State _____

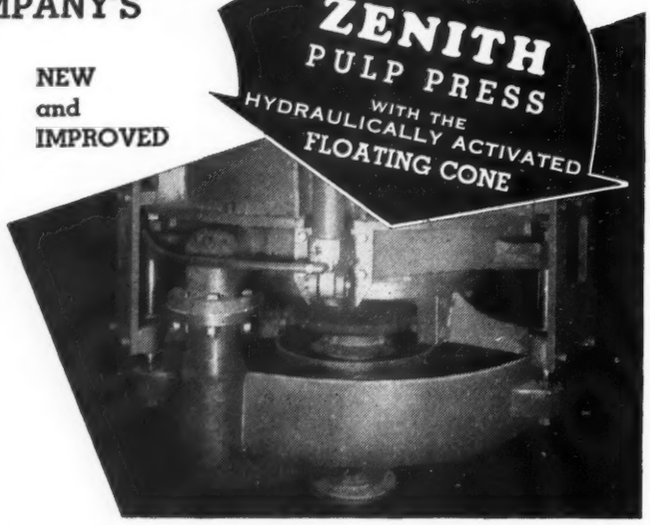
SERVING INDUSTRY...WHICH SERVES MANKIND

JACKSON & CHURCH COMPANY'S

NEW and IMPROVED

ZENITH PULP PRESS WITH THE HYDRAULICALLY ACTIVATED FLOATING CONE





JACKSON & CHURCH COMPANY'S ZENITH PRESS offers GREATER efficiency . . . GREATER profits . . . with the hydraulically-operated cake discharge port or "floating cone."

Long the finest dewaterer on the market, Zenith's new 100% automatic continuous operation assures CONSTANT, UNIFORM discharge pressures at any predetermined degree by finger-tip control. Cake Uniformity assured.

With new Zenith you'll notice decreased maintenance costs and minimum power consumption as compared to fixed-opening equipment.

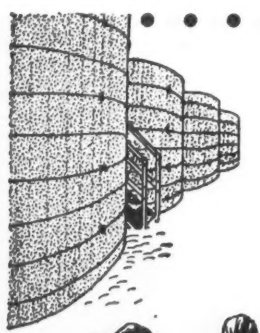
These J & C engineering triumphs . . . found only in Zenith Press . . . are available to paper pulp manufacturers, canneries, corn starch plants, fish reduction plants, meat packers, glue plants, and citrus and waste drying plants.

For engineering or additional data write Jackson & Church Company at Saginaw, Michigan.

A PRODUCT OF

JACKSON & CHURCH COMPANY, SAGINAW, MICHIGAN

WORK WELL DONE SINCE '81



FOOD PROCESSING EQUIPMENT *A Problem?*

Tidewater RED CYPRESS

IS YOUR ANSWER!

A PROVEN FACT: Tidewater Red Cypress does not impart odor, taste, or discoloration to food with which it is brought into contact. This fact alone makes it ideal for such items as fermenting vats, processing tables, churns, pickle containers, etc.

A PLUS VALUE: This outstanding wood also offers extraordinary resistance to deterioration when used under adverse conditions such as extreme dampness, heat, etc.

S C N A — Tide Water Red Cypress "The Wood Eternal"

LET US HELP YOU. WE INVITE INQUIRIES CONCERNING ALL TYPES OF TANKS AND VATS FULLY FABRICATED OR PARTIALLY FABRICATED

FLEISHEL LUMBER COMPANY

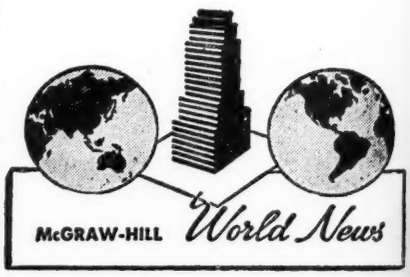
4230 DUNCAN • ST. LOUIS 10, MO. • NEwstead 2100

sures are taken, 500,000 head of livestock will be involved this year in such diseases as blackleg, cholera, soremouth, distemper, anthrax and internal parasites.

Food Conservation Established by USDA

FUNCTIONS and procedures of the Office of Food and Feed Conservation, established by USDA, last December, were recently published in the Federal Register.

There are to be three major divisions within the office: Consumer activities, farm activities and industry activities. The industry division will serve as a focal point for the development and coordination of the program relating to the use of grain and other foods by brewers, millers, wet and dry processors, bakers, distillers and kindred manufacturers and handlers. Established field offices of USDA and other agencies will be used. Assistant Secretary Charles F. Brannan has been named acting director.



Inhibit Corrosion In Canned Citrus Juices

MELBOURNE—To inhibit the violent corrosive action of canned citrus juices on cracked or imperfectly coated can walls, Jusfrute Ltd., Gosford, N.S.W., devised a method of gelatinizing the juices sufficiently to prevent migration of the metal ions while permitting quick restoration of liquidity upon opening of the can.

Cans have recently been opened up after three years. Application of the process, which was developed to meet wartime demand in the services, is at present restricted owing to the tin-plate shortage, but is successfully used in the canning of trade essences.

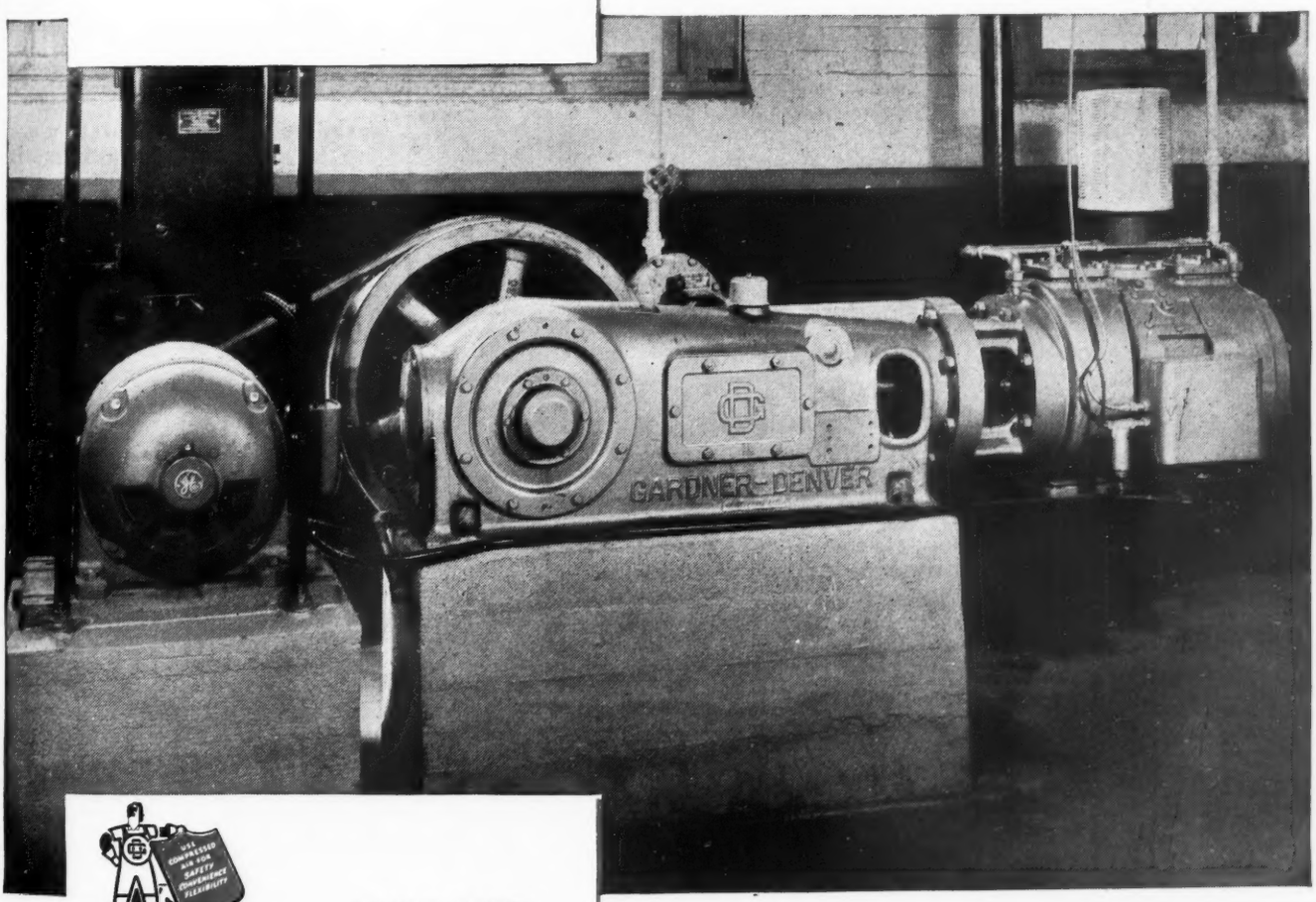
In the canning of orange or other citrus juices about 12½ percent of the total quantity (i.e. about 10 pints to each 10 gallons) is drawn off, neutralized with chemically pure sodium hydroxide and heated to 160 deg. F. (71 deg. C.). 455

Lubricating oil is poor seasoning

YOU'LL never worry about oil contaminating your food products when you use a Gardner-Denver "CRX" Carbon Ring Compressor. Its special construction features are your guarantee that the compressed air used in processing remains absolutely *oil free*. For there is *no* lubricating oil in the cylinder. Carbon rings replace the usual cast iron rings that require lubrication . . . and a special device further prevents oil from the crankcase being carried along the piston. Other reasons food processors like this Gardner-Denver Compressor are:

* *Main frame is completely enclosed—oil-tight, dust-tight.*
* *Large and unrestricted port areas help reduce heat of compression, insure effective lubrication with minimum oil consumption.*
* *Duo-plate cushioned valves are simple, durable and unusually quiet—actually become tighter with wear.*
* *Double row Timken tapered roller main bearings.*

For complete information, write Gardner-Denver Company, Quincy, Illinois.



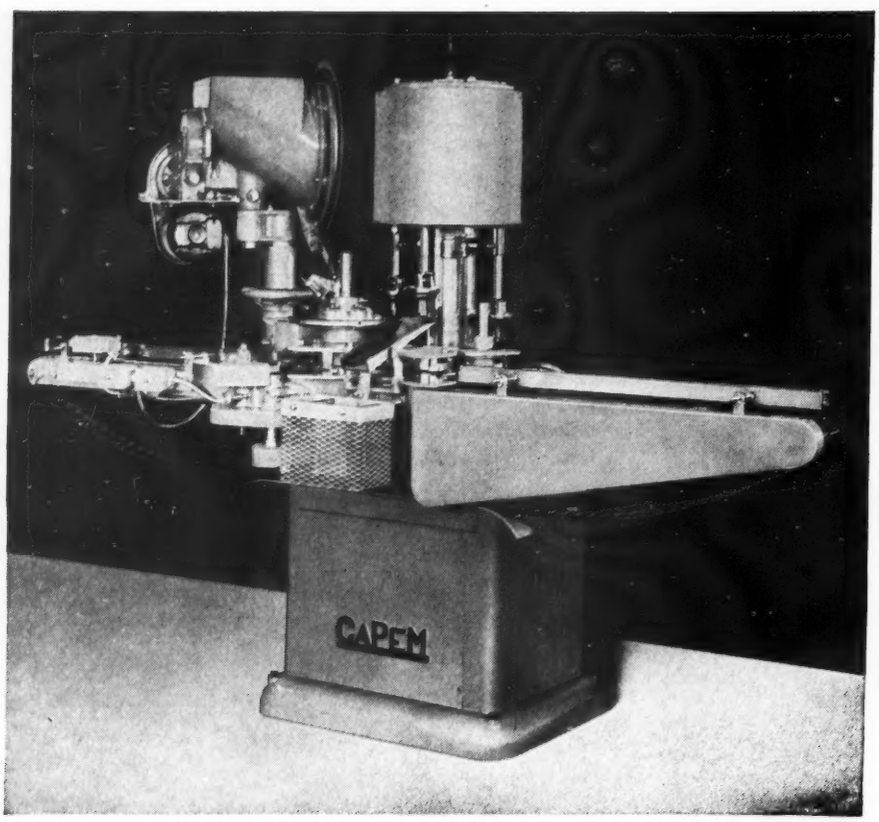
SINCE 1859

GARDNER-DENVER

Gardner-Denver "CRX" Single-Stage Carbon Ring Compressor—furnished in capacities from 89 to 1292 cubic feet displacement per minute.

CAPEM

THE MODERN SCREW CAPPER



- Applies any type of standard screw cap or cover at speeds of 2000 to 10000 per hour.
- Takes container from conveyor line, applies cap perfectly, and returns container to conveyor AUTOMATICALLY without intermediate handling.
- Handles bottles, jars, cans or jugs of any size or shape.
- Delivers a perfect, LEAKPROOF seal at low cost.
- Available in 1, 2, 4, 6 and 8 spindle models.

Write for prices and delivery.

CONSOLIDATED PACKAGING MACHINERY CORP.
BUFFALO 13, N.Y.

grams of agar-agar are added to each 10 pints and after thorough agitation the stock solution is complete and added to the remaining juice which has also been heated to 160 deg. F.

The juice, containing about 1 percent of agar-agar, is canned and cooled. The concentration of the jelly forming in the can is such that on addition of water it liquefies with ease. Among various gelatinizing substances agar-agar was found most suitable, particularly Australian agar-agar because of its relatively high melting point.

Powdered Human Milk Developed By Dutch

AMSTERDAM — With a view to combating infant mortality, the Netherlands Red Cross has started supplying mother's milk in powder form. A Mother's Milk Central Organization has been established at Amsterdam. Dr. Gerrit G. A. Mastenbroek of Amsterdam, analyst of the Red Cross blood transfusion service, has succeeded in preserving dried mother's milk. It is expected that many mothers having an excess of milk will be prepared to have this excess tapped, preserved, and distributed to sick babies.

The milk is tapped by means of a simple apparatus imitating sucking baby lips. The milk is then frozen and subsequently pasteurized and dried in a similar way as blood plasma. Distribution takes place in small bottles of 100 cubic centimeters. After opening of the bottle the powder, dissolved in

British Combine

WHERE TALL CANE GROWS

Sugar cane grows tall in Hawaii. This 18-month crop is a highly cross-bred variety that is said to produce as much as 140 tons to the acre. It belongs to the Oahu Sugar Co.

Can CENTRIFUGAL FORCE *speed up your process?*

DE LAVAL centrifugals have frequently been able to speed up operations involving separation of two liquids, clarification of one or two liquids, or the separation of two liquids plus the continuous removal of solids from one or both liquids. The common denominator is always "continuous." Centrifugal force allows the separation to be done as part of a whole process, without interruption.

Most applications in the Food Industries are uncovered with the cooperation of food plant engineers who, dissatisfied with slower methods, investigate the possibilities of speeding up things with centrifugal force. Such "discoveries" pay out handsomely. Are there possibilities in your plant?

SOUP Centrifugal Separators skim grease off chicken broth; centrifugal Clarifiers take seed and dirt from tomato pulp for tomato puree.

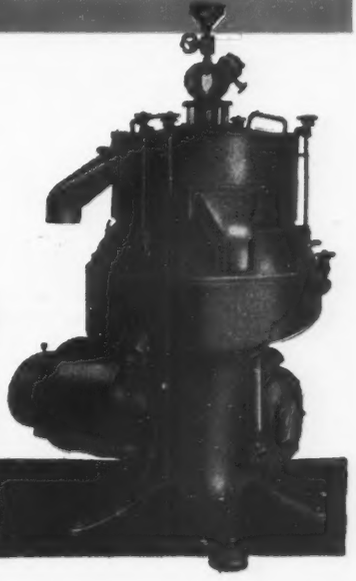
YEAST De Laval "Nozzle-Matic" centrifugals separate yeast from wort at highest capacities. In general, if the concentration of yeast fermented liquor is 5½ to 6% (compressed basis), the concentration after centrifuging will be 50 to 60% or more.

FISH OIL De Laval "Nozzle-Matic" machines continuously extract oil from meal and also separate oil from press liquor. Other De Laval centrifugals dehydrate and polish the fish oil.

VEGETABLE OIL
Centrifugal Separators are part of the De Laval Engineered Systems for refining vegetable oil. These systems eliminate settling and reduce losses substantially over kettle method of refining.

CITRUS OIL De Laval "Nozzle-Matics" separate essential oil from peel water and simultaneously remove and discharge the particles of fine interlining skin of the fruit. Other De Laval machines polish the oil.

YOUR PROCESS?



THE DE LAVAL SEPARATOR COMPANY
165 Broadway, New York 6 427 Randolph St., Chicago 6
DE LAVAL PACIFIC CO., 61 Beale St., San Francisco 5
THE DE LAVAL COMPANY, Limited, Peterborough, Ont.

De Laval CONTINUOUS *CENTRIFUGAL* PROCESSING

For Better, Faster Food Processing
SEPARATION · CLARIFICATION · CONCENTRATION

The No. 2030 Series Bar-Nun Rotary Sifter, as furnished, complete with motor and "V" belt drive, ready to install and operate.

A new BAR-NUN SIFTER Catalog, which contains complete information, will be sent upon request.

"BAR-NUN Rotary Sifters EXCLUSIVELY"

The superintendent of a large midwestern milling company, where four Bar-Nun Rotary Sifters are operated on a continuous, twenty-four hour a day basis, writes:

"The performance of these four sifters was a very great factor in our using Bar-Nuns exclusively in our new plant."

Bar-Nun Rotary Sifters provide efficient separation, by particle size, of most all dry, flaked, granular, or powdered materials. Bar-Nun Sifters are available in 3 basic sizes and each size can be furnished with one, two, or three screens to deliver two, three, or four sizes of product separations. Available in sizes ranging from 4 to 60 square feet of cloth surface.

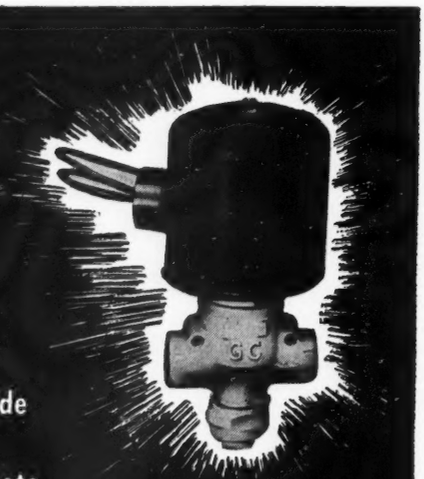
B.F.Gump Co.

Engineers and Manufacturers Since 1872

454 SOUTH CLINTON STREET **CHICAGO 7, ILLINOIS**

New

K-20-5
ELECTRO-MAGNETIC
VALVE



THE *UNSURPASSED*
REFRIGERANT VALVE

For Freon Methyl Chloride
Sulphur Dioxide
also Air, Water, Gas, Light Oils, etc.

PROVIDES on and off control of liquid or suction lines. Used with standard thermostats for positive control of refrigerants in either defrosting or reverse cycle systems, multiple temperature processes or with by-pass or unloading valves. Bodies are die forged and all internal parts are bronze or stainless steel.

FOR AUTOMATIC CONTROLS specify General Controls. Request new Catalog 52C, Automatic Pressure, Temperature and Flow Controls.

GENERAL CONTROLS
801 ALLEN AVENUE GLENDALE 1, CALIF.
Manufacturers of Automatic Pressure, Temperature & Flow Controls
FACTORY BRANCHES PHILADELPHIA • ATLANTA • BOSTON • CHICAGO • DALLAS
KANSAS CITY • NEW YORK • DENVER • DETROIT • CLEVELAND • PITTSBURGH
HOUSTON • SEATTLE • SAN FRANCISCO • DISTRIBUTORS IN PRINCIPAL CITIES

253

Press Association

ROADSIDE CORN

England's first attempt to cultivate land running beside main roads was recently started near South Mimms, where a mile long stretch is being plowed for corn.

warm water, must be consumed within 24 hours. The Amsterdam milk drying capacity will be enlarged to 10,000 liters.

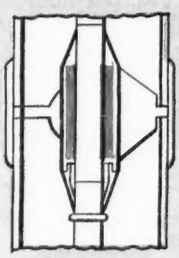
Aussie Bread Bakers Add Fat To Skim Milk

MELBOURNE — Addition of skim milk powder to bread dough will impair rather than improve the quality of loaves unless fat or sugar or both are added with the skim milk. This is the conclusion from an investigation by the Council for Scientific and Industrial Research into the strange phenomenon observed in Australia that, contrary to American experiences, the addition of skim milk powder to the common loaf of bread reduces its volume and produces a harsh and immature crust with a coarse, open crumb. The only breads in Australia that contain milk powder are the fancy loaves for which demand is limited.

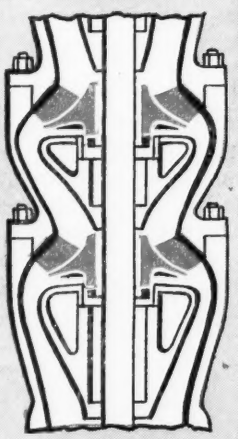
The Council reports that by combining skim milk powder with fat or sugar or both a loaf far superior to water bread can be produced. The Council suggests addition of fat in the form of emulsion. Satisfactory results are also obtained with a powder containing 20 percent fat. The most desirable amount of powder to add to bread is 12½ percent.

The report points out that ordinary white bread is a poor source of several essential food constitu-

EASY ADJUSTABILITY. With one simple "at the surface" adjustment, you can vary capacities over a wide range without power-wasting "throttling." Adjustment nut can also be used to compensate for wear . . . assuring new pump efficiency *for the lifetime of the pump!*



QUIET, SMOOTH OPERATION. Pomona's revolvable rubber shaft bearings assure vibration-free shaft support under all conditions.



FREEDOM FROM SAND-LOCKING. You won't have any costly stoppages with Pomona. Open impeller design assures complete freedom from sand-locking . . . minimizes wear . . . eliminates the need for sealing or wearing rings.

WATER LUBRICATION. Pomona's *true* water lubrication is your guarantee of clean, clear water. Water lubrication also means simplicity of design with fewer working parts for maximum dependability, lower operating costs, less maintenance.

IT isn't just chance that Pomona gives you all the features you've always wanted in a vertical turbine pump. Lowest-cost-per-gallon service . . . unequalled dependability . . . simplicity of installation and maintenance, these are "designed-in" features resulting from years of experience. Just check these features. You'll find what you want!

WHAT YOU WANT IN A PUMP YOU GET WITH

POMONA!

CHECK THESE and other "wanted" Pomona features with your Fairbanks-Morse Pomona dealer or branch pump engineer. They can show you how the Pomona line . . . sizes from 4 to 36 inches, capacities from 15 to 20,000 G.P.M. . . . gives you more!

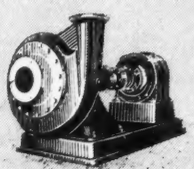
Fairbanks, Morse & Co., Chicago 5, Ill.

FAIRBANKS-MORSE

A name worth remembering

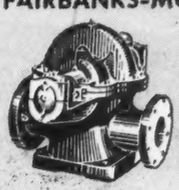
DIESEL LOCOMOTIVES • DIESEL ENGINES • PUMPS • SCALES • MOTORS • GENERATORS
STOKERS • RAILROAD MOTOR CARS and STANDPIPES • FARM EQUIPMENT • MAGNETOS

A FEW OF THE COMPLETE LINE OF FAIRBANKS-MORSE PUMPS

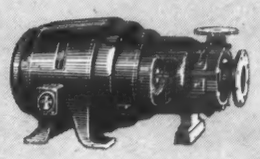


Trash Pumps

Side-Suction

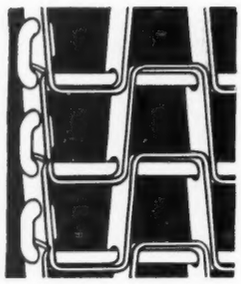


Centrifugals



Builtogether

OAKITE CLEANERS
are your best bet for dependable sanitation!



for example:

clean belts last a long time: Thorough cleaning action of Oakite Composition No. 20 speedily removes tomato, carrot, potato and residual deposits—without harming surfaces. For complete rust and stain removal use kind-to-metals Oakite Compound No. 84M. GRATIS Oakite "97" Digest gives full details.

for example:

clean kettles protect product purity: Ward off bacterial contamination; use Oakite Compound No. 63 to clean processing and handling equipment. O.C. 63 has gentle, yet thorough emulsifying action that completely removes soil. Rinses freely and readies surfaces for sure germicidal treatment. Oakite "97" Digest tells about it. Your copy FREE.

for example:

clean retort baskets mean clean cans: Spill-over residues thoroughly removed by soaking units in recommended solution of Oakite Composition No. 63. This high-speed detergent easily breaks up bacteria-harboring fruit and vegetable soils. Does not attack metal. FREE Oakite "97" Digest gives full details.

Ready for the Coming Season?

Take a look around your plant. For every place you see to protect product purity with *time-saving* Oakite cleaning, you see a place where you can conserve equipment with *safe* Oakite cleaning. For facts about 97 day-in and day-out food plant cleaning jobs, send for the Oakite "97" Digest. Or ask the Oakite Technical Service Representative to show you Oakite cleaning in thorough, safe, economical cleaning action. No obligation, either way.

OAKITE PRODUCTS INC., 26G Thames St., NEW YORK 6, N. Y.
Technical Service Representatives in Principal Cities of U. S. & Canada

OAKITE REG. U.S. PAT. OFF.
MATERIALS
METHODS
SERVICE

Specialized Industrial Cleaning

ents, of which skim milk powder is a particularly good source.

Some Progress Seen In Soviet Food Machines

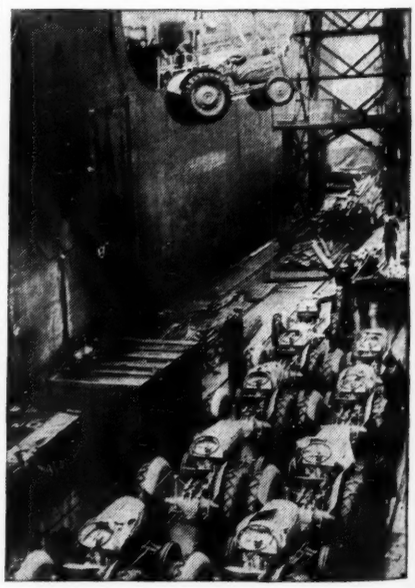
MOSCOW — The Soviet machine-building industry is now putting out diverse new types of automatic and original machines for the food, timber and glass industries, an example of the current trend here for maximum mechanization of all production processes.

In the line of dairy equipment, a cream separator with a productivity of 264 gal. per hour, a butter churn of 264 gal. capacity, and a milk dryer with output capacity of 110 lb. of dry product per hour are in production. A new type of all-metal non-roller butter churn is also being made.

In flour mill equipment great interest is attached to a machine designed to moisten grain before grinding in jobbing mills. Development work is nearing completion on a roller machine that makes grain milling automatic.

Among meat-packing machines now in production are an automatic sausage and sardelle stuffer and a quick-freeze apparatus designed for preliminary cooling of meat products.

Application of an extracting process instead of old-fashioned pressing methods to recovery of oil from sunflower, cotton and other oil seeds has resulted in extracting all but 1 percent of the oil whereas under old pressing methods 88 percent of the oil remained in the oil-cake.



Press Association
TRACTORS FOR U. S.
The universal need for farm machinery is demonstrated in this loading of $20,000,000 worth of British tractors for U. S.

This refrigerator car is just one of the many different kinds of specialized General American Cars that serve the nation's shippers transporting perishables safely and economically.

GENERAL AMERICAN

BUILDERS AND OPERATORS OF ALL TYPES OF REFRIGERATOR CARS FOR PERISHABLE GOODS

No matter what kind of perishable product you ship—milk or melons, beer or bananas—there is a General American Refrigerator Car that is tailor-made to fit your needs.

General American maintains an office in almost every producing area to place at your disposal able representatives whose job it is to help you solve your indvidual shipping problems . . . swiftly and economically.

Whenever you ship . . . whatever you ship . . . ship via General American, and realize the advantages of General American's nation-wide reputation for reliability and responsibility . . . a reputation built out of years of experience serving America's leading shippers.

UNION REFRIGERATOR TRANSIT LINES
MILWAUKEE
A DIVISION OF
GENERAL AMERICAN TRANSPORTATION CORPORATION
CHICAGO

it's no trick

To Apply Mathews Portable Conveyers

● For unloading cars and trucks, for speeding materials into storage and out again, and for piling and stacking, Mathews Wheel or Roller Conveyer lines, together with reversible portable Belt Conveyers, are a highly efficient combination. Important, too, is the fact that applying this equipment requires no special training. The Universal Couplings make all curves reversible, and the tripod type supports are easy to use and *safe* to adjust. There are no pinched fingers when using these locknut type stands.

● The Portable Belt Conveyers are strongly built and equipped with quality rubber-tired wheels. The conveyers can be easily and *safely* adjusted by one man.

● You can't beat this handling team. There is nearly a half century of experience behind Mathews portable equipment. It is designed right, built well, and readily available.

● Write today for complete information.

MATHEWS CONVEYER COMPANY
ELLWOOD CITY, PENNSYLVANIA

MATHEWS CONVEYER COMPANY WEST COAST
SAN CARLOS, CALIFORNIA
MATHEWS CONVEYER COMPANY, LTD.
PORT HOPE, ONTARIO
Engineering Offices or Sales Agencies in Principal American and Canadian Cities

The extracting installation consists of 17 complicated machines operating on a continuous process. Three are now in operation at Ukrainian sunflower oil plants operated by the Soviet Ministry of the Food Industry which this year will install five more extracting apparatuses, expected to add annually seven to eight thousand tons to the sunflower oil output. In addition to seeds, these machines will process oil-cakes delivered from plants that employ the pressing method.

Twenty of the new continuous process extracting machines are to be produced during this year and next.

Sweet Peppers

AS FORECAST last month, U. S. grade standards for sweet peppers for processing have been promulgated, and became effective, March 22. Practically no change was made from the original proposals.

Canned Beans

CANNED green and wax beans' identity and quality standards may be amended as a result of a hearings scheduled to begin on March 16.

SCHEDULE OF EVENTS

April

4-7—Associated Retail Bakers of America, annual convention, Hotel Sherman, Chicago.
5-8—National Association of Corrosion Engineers, 4th annual conference and exposition, Jefferson Hotel, St. Louis, Mo.
7-9—Midwest Power Conference, 10th annual meeting, Sheraton Hotel, Chicago.
7-10—National Fisheries Institute, 3rd annual convention, Fairmont Hotel, San Francisco.
19—The American Bulk Condensed Milk Association, 3rd annual meeting, Edgewater Beach Hotel, Chicago.
19-23—American Chemical Society, 113th national meeting, Stevens Hotel, Chicago.
26-30—American Management Association annual packaging conference and exposition, Public Auditorium, Cleveland, Ohio.
28-May 1—American Society of Brewing Chemists, annual meeting, Hotel Statler, St. Louis, Mo.

May

4-6—American Oil Chemists Society, 39th annual meeting, Roosevelt Hotel, New Orleans.
10-12—Millers National Federation, annual convention, Edgewater Beach Hotel, Chicago.
10-14—Society of American Bacteriologists, annual meeting, Nicollet Hotel, Minneapolis, Minnesota.
13-15—Southeastern Frozen Food Locker Association, annual convention and exposition, City Auditorium, Atlanta, Georgia.
17-21—Association of Operative Millers, annual convention, Morrison Hotel, Chicago.
23-28—American Association of Cereal Chemists, 33rd annual convention, Netherlands Plaza Hotel, Cincinnati, Ohio.
31-June 1, 2—American Society of Refrigerating Engineers, spring meeting, Ocean House, Swampscott, Massachusetts.

June

6-9—Institute of Food Technologists, 8th annual convention, Benjamin Franklin Hotel, Philadelphia, Pa.
20-25—National Confectioners Association, 65th annual convention and 22nd confectionery industries exposition, Waldorf-Astoria Hotel, New York City.

Changes in Food Supplies

(Indicators)

Production

The canned tomato pack, for 1947, came to 27,709,000 cases on a 24/2's basis, which compares with 23,857,000 cases packed in 1946, in the estimates of the National Canners Association.

The canned lima bean pack amounted to 2,153,772 actual cases, in 1947, approximately 25 percent larger than the 1946, output of 1,717,887 cases, according to the National Canners Association.

Dry casein production reached 31,333,000 lb., in 1947, a gain of 72 percent over the previous year and 16 percent above the five-year average. This was the highest production since 1942, but manufacturers' stocks, on December 31, were the lowest on record, 1,275,000 lb.

Canned meat and meat products, processed under federal inspection, utilized 1,519,000 lb. in 1947, approximately 12 percent less than 1,735,000 lb. used in 1946.

Poultry canned or used in canning, during December, totaled 9,323,000 lb., compared with 8,905,000 lb. used in December, 1946, and 7,960,000 lb., in 1945. The quantities consisted of 8,642,000 lb. of chicken and 681,000 lb. of turkey.

Liquid egg production, in December, dropped to 3,846,000 lb., which compares with 16,604,000 lb. in December, 1946.

Dried egg production totaled 162,000 lb. last December, as against 3,947,000 lb. in December, 1946.

Frozen eggs produced in December amounted to 3,266,000 lb., only slightly below the 3,594,000 lb. for December, 1946.

Ice cream production in January was estimated at 30,620,000 gal., down 21 percent from a year earlier, but 29 percent above the 1942-46 January average.

Raw Materials

Chicks produced in commercial hatcheries during January were 9 percent under the January 1947 hatch. Total output was 53,590,000, compared with 58,688,000 a year ago. The high price of feed in relation to egg prices and the fuel oil shortage have contributed to delay in brooding of chicks.

Citrus production for the current season is somewhat smaller than record years, but far above the average. Orange harvest is expected to reach 108,600,000 boxes, 5 percent less than last season, but 30 percent above the average. The grapefruit total is estimated at 62,000,000 boxes, slightly below the 63,450,000 boxes produced in 1945, but above last year's output of 59,520,000 boxes.

Stocks and Storage

Soybean stocks, on January 1, were the smallest in the six years for which data are available and were 9 percent under a year ago. Crushings, on the other hand, during the October-December quarter were only slightly smaller than last year's record and were 10,000,000 bu. larger than the average for the four previous years.

Peanut supplies, converted to a farmers' stock basis, held in commercial positions on January 31, were 1,138,000,000 lb., slightly under 1,000,000 lb. more than the 1,044,000,000 lb. held Jan. 31, 1947. A total of 149,000,000 lb. were cleaned and shelled during January, the smallest quantity for any January since 1942.

Frozen fish and shellfish held in storage February 1, totaled 112,048,763 lb., a drop from the 127,380,686 lb. held Feb. 1, 1947.

Indexes

The commodity price index on foods, compiled by the New York Journal of Commerce, was 194.7 for the week ending March 6, compared with 190.5 for the previous week, and 196.4 for March, 1947.

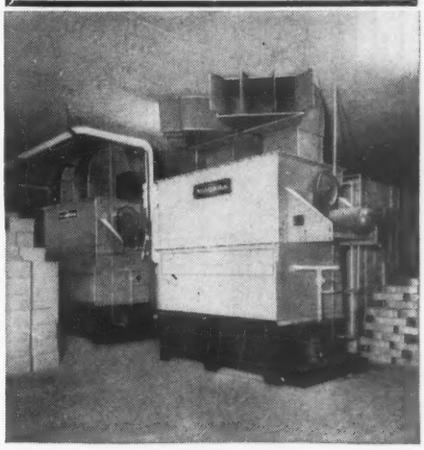
Business week's index of business activity stood at 190.4 for the week ending February 28, as against 189.6 for the previous week, 188.5 the month before, and 193.2 a year ago.

CONSTRUCTION NEWS

	Pending (thousands)	Total Awarded March (thousands)	Total Awarded 1948 (thousands)
Bakery	$6,050	$....	$ 220
Beverages	293	1,136	3,895
Canning and Preserving	70	....	320
Cold Storage	530	226	460
Confectionery	75	....	100
Grain Mill Products	1,626	68	2,976
Ice, Manufactured	68	....	....
Meats and Meat Products	....	120	551
Milk Products	....	68	1,513
Miscellaneous	476	111	2,647
	$9,188	$1,729	$12,682

NIAGARA "NO FROST"

Gives Increased Capacity for Higher Production



• The ice on your refrigeration coils costs you more than just the trouble and interruption of defrosting. There is constant loss in power, money and production that starts with the first film of frost and increases by the hour.

The NIAGARA "NO-FROST" METHOD eliminates this loss completely, giving you constant full capacity, maintaining your specified temperature without interruption, protecting the quality of your product, saving trouble and maintenance difficulty, and increasing your production at lower cost.

In any refrigeration installation requiring refrigerant temperatures below freezing, NIAGARA "NO-FROST" improves operating conditions, and in food refrigeration, it helps improve the quality of the product.

Ask for Bulletin 83-F. I.

NIAGARA BLOWER COMPANY

Over 30 Years of Service in Industrial Air Engineering

405 Lexington Ave., New York 17, N.Y.

Field Engineering Offices in Principal Cities

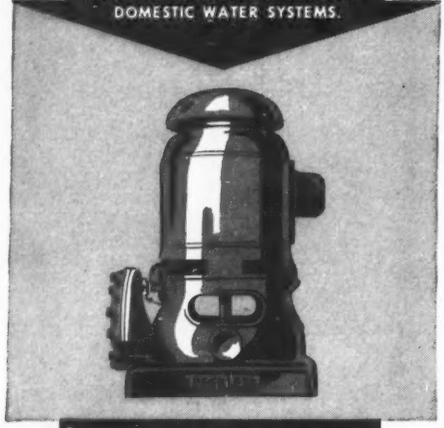
NIAGARA

AIR ENGINEERING EQUIPMENT

We'll help you engineer the correct pump to your application

VERTICALS

VERTICAL DEEP WELL AND CLOSE-COUPLED TURBINE PUMPS–HYDRO-FOIL PROPELLER AND MIXED FLOW PUMPS – MINE PUMPS – HI-LIFT PUMPS – UNDERWRITERS' APPROVED VERTICAL FIRE PUMPS – DOMESTIC WATER SYSTEMS.



HORIZONTALS

GENERAL PURPOSE PUMPS – BOILER FEED PUMPS – SEWAGE PUMPS – CHEMICAL PUMPS – UNDERWRITERS' APPROVED FIRE PUMPS – REFINERY AND PROCESS PUMPS.

Plan with Peerless

FOR *unbiased* PUMP RECOMMENDATIONS

FOR MOST SERVICES fmc PEERLESS PUMPS IN ALL INDUSTRIES

Peerless manufactures pumps in both vertical and horizontal types for most services in *all* industries. Bulletins describing individual applications of each of these types of pumps are available on request.

PEERLESS PUMP DIVISION

FOOD MACHINERY CORP.

Factories: Los Angeles 31, Calif.; Quincy, Ill.; Indianapolis, Ind. *District Offices:* Chicago 40, 4554 N. Broadway; New York 5, 37 Wall St.; Atlanta Office: Rutland Bldg., Decatur, Georgia; Dallas 1, Texas; Fresno, Calif.; Los Angeles 31, Calif. *Distributors in all Principal Cities*

What Washington Thinks

By R. S. McBRIDE, Washington, D. C.

OLEO IS BETTER – Butter advocates got a mean dig from baby-feeding specialists recently. It was most annoying because it came right in the middle of the Washington battle over margarine tax repeal. It took the form of a report in Chicago on a two-year study of feeding of over 200 children under closely controlled conditions in two institutions in the windy city. The essence of the conclusion was: Margarine-fed children maintained a high degree of good health, and "in comparing their health to that of the butter group it appears to have been much better." Perhaps fortification of margarine with vitamins does more good than color fortification of butter.

TO OFFSET A THREAT – Maryland State officials have warned canners of the State that they will be required to keep solid refuse out of State streams, beginning this year. Thus stream pollution prevention becomes a must in Maryland; and the prescribed waste disposal methods are likely to be looked on with equal disfavor in neighboring states. Almost simultaneously Tri-State Canners' Association was holding its winter convention, followed by a "short course" on means of stream pollution control. University of Maryland and University of Delaware were both busy collaborators in the programs. Thus the two institutions assure the industry of real help in meeting the tightened regulations.

"PIOUS PLATITUDES" – One outstanding Washington interpreter, discussing food and industrial relief for Europe, has criticized State Department plans as being "pious platitudes." Different than most critics, he offers one specific partial corrective. He is urging that strictly business methods, under experienced business executives, be applied at all stages of procurement, packaging, transportation, and distribution of the goods that must go under the Marshall Plan. He has been one of the most effective educators at the Cabinet level. He is credited with having converted about half of the Cabinet to the thought that after political policy has been fixed by the President and Secretary of State, of course within Congressional definitions, then the Cabinet better leave the business operations to somebody who is business-minded. Certainly all of the food executives of the country hope that this lesson will stay learned.

A POOR CUSHION–Economists about Washington are talking of the "pent-up buying demand" that is going to prevent hazards of further price collapse. That economic theory might be useful if the "demand" were supported by a plump pocketbook. Actually high food costs have so deflated the average housewife's purse that it is not a very good billiard cushion off which the business cue ball can bounce. Washington does not fear a general price collapse, far from it. But some of the interpretations seem worse than the problems they try to explain.

CITRUS CHANGES – During the season that closed last year the quantity of oranges processed for juice and segments exceeded that of grapefruit for the first time. It looks as though this citrus competition is still currently favoring oranges, for official summary of the fruit situation indicates "the heavy movement of oranges to processors continues" this year (1948).

SUSTAINED ABUNDANCE – Food technology has presented to it an important part of the program of the future agricultural policy that official Washington now calls "sustained abundance." This is a repudiation of the Wallace "policy of scarcity." Our new technical job is to make sure that local and seasonal surpluses are promptly handled by suitable processing to spread abundance through the year and over the country. It is not clear that Department of Agriculture officials realize in full the magnitude of the technical problem presented to us. But the responsibility already exists;

CHANGE OF ADDRESS

DIRECTOR OF CIRCULATION, FOOD INDUSTRIES
330 WEST 42nd STREET, NEW YORK 18, N. Y.

Please change the address of my Food Industries subscription.

Name .....

Old Address .....

New Address .....

New Company Connection .....

New Title or Position .....

and the recognition of the food industries as the place where the responsibility rests is beginning to percolate into official thinking.

BUYER'S CHOICE—Processed eggs are not as abundant this year as last. This results not from scarcity, but from lack of buyers. And from the way egg buyers have reacted one can guess an important trend. Here are the official facts: Dried eggs are being made at 5 percent the rate a year ago. Liquid eggs are at 25 percent of the previous year's rate. Frozen eggs production is 90 percent of that a year ago. Who said that the frozen food business was not going ahead substantially? The huge drop in dried eggs was undoubtedly caused by lack of foreign sales and the dollar shortage abroad.

F. T. C. COMMANDMENTS—Renewed postwar activity of Federal Trade Commission is evidenced in several food industries. In February, fat renderers got their new code in tentative form. This month the confectionery wholesale industry has a new code to study. All the commandments brought down from Washington by the commission sound much like a repetition of Moses' injunctions from Mount Sinai. They're a definition of honest fair dealing in trade language. Let's hope more folks practice them than seem to observe Moses' set.

BETTER GRADES—Industry advisers of the Research and Marketing Administration in the Department of Agriculture have been studying peanut problems zealously, among many others. Very high on the advisers' list of needed research on peanuts is a revision of Grade Standards. It is evident that processors of agricultural commodities, and most of us are that in the food business, are approaching the time when we can be a bit fussy about the quality of our raw materials bought from the farmers. It looks as though active cooperation of purchasers with producers may help in a lot of cases, as well as with peanuts. Certainly any industry that forgets to develop accurate and dependable standards for raw materials lives in a state of controversy, if not worse.

SURPLUS FOR LUNCH—Not all the school lunch programs can be made up from surplus commodity bought to maintain floors under agricultural prices. But substantial progress has been made and is likely to be continued. Early spring contributions to this plan have been a half million cases of grapefruit juice and 150 carloads of winter pears from the Pacific North west. If Uncle Sam must support prices in this fashion, perhaps the least burden on taxpayers will come from this technique for product disposal. Each ton of food so given to the school lunch program saves the taxpayers the equivalent in dollar subsidy. This is true because you and we and other taxpayers are really giving these near-free lunches for millions.

Room for Profit Overhead
Your costs will come down when you install Buschman Universal Cable Type Trolley Conveyors overhead. At the same time save valuable space for production, assembly and storage.
Floor or ceiling mounted in one plane or with dips from floor to floor. Simple field installation. No welding required. Representatives in principal cities. Write for bulletin No. 40.
Buschman
THE E. W. BUSCHMAN CO., INC.
4277 Clifton Avenue
Cincinnati 32, Ohio

COMMERCIAL ENZYMES

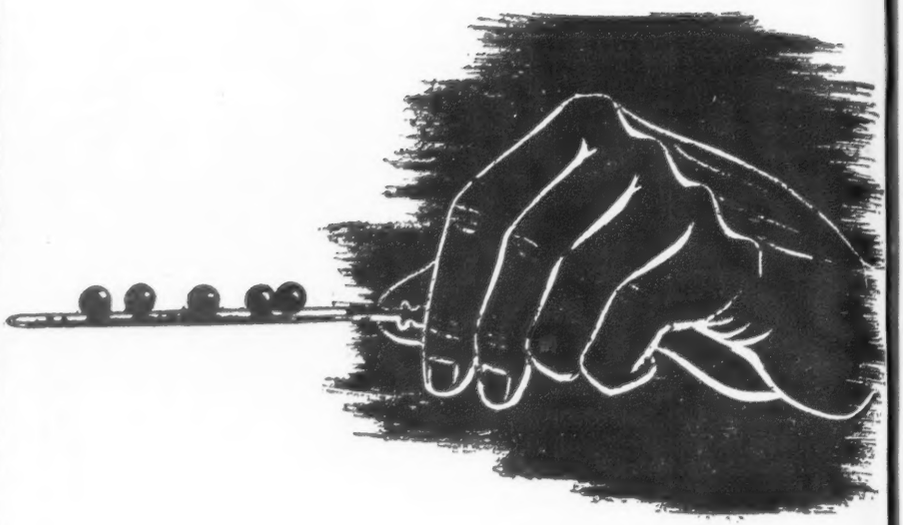
A letter to Rohm & Haas brings you full details of R & H Commercial Enzymes—processing aids in scores of industries utilizing natural materials.

Whether you are modifying or solubilizing proteins, hydrolyzing proteins to peptides or amino acids, dextrinizing or saccharifying starches, these versatile bio-catalysts give you efficient *direction and control* of your processes. The results are faster production, improved quality, greater yield and lowered costs.

Our 40-years experience in commercial enzymes may be the means of saving you much time and trouble. Make your letter as specific as possible and as lengthy as you wish.

ROHM & HAAS COMPANY
WASHINGTON SQUARE, PHILADELPHIA 5, PA.

it takes balance



Whether it's peas on a knife . . . or the emulsifier you choose for your needs . . . it takes balance!

Your emulsifier must be scientifically balanced to do precisely what you require. This is the basis upon which The Emulsol Corporation built its research in developing such outstanding products as:

- Emcol MS: High monoester glyceryl monostearate —non self-emulsifying—edible.
- Emcol RH: Self-emulsifying glyceryl monostearate —edible. Designed for Emulsifying, Plasticizing, Texturizing, Freshening, Bodying, Stabilizing.

And most keenly balanced of all . . . The Emulsol Corporation's recognized "know-how" technical services. Send us your problem on your letterhead and, at no obligation, we will give you the most effective answer.

THE EMULSOL CORPORATION

59 East Madison Street **Chicago 3, Illinois**

MEN • JOBS • COMPANIES

INDUSTRY

The Arkansas Rice Growers' Cooperative Association has announced plans for doubling the capacity of its rice mill in Jonesboro, Arkansas. A clean rice-storage warehouse will be constructed of reinforced concrete and will be equipped with a Zeleny bin thermometer system, electrically interlocked automatic blending scales, conveyor system and modern handling facilities.

The Borden Company has transferred all soybean research and development activities to the Borden's Soy Processing Company at Waterloo, Iowa. New laboratories, just completed at Waterloo, will be the scene of an intensified and highly integrated research program in the development and improvement of products made from soybeans.

Carr-Consolidated Biscuit Co., has closed its Louisville, Ky., bakery and transferred that unit's cracker and cookie production to its recently constructed St. Louis, Mo. plant. This move is in line with the company's program to concentrate baking operations in more modern and strategically located plants.

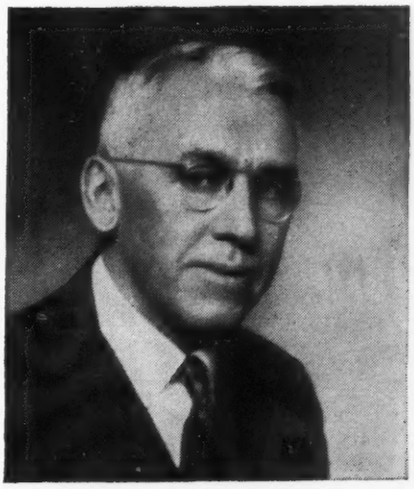
Corn Products Refining Co., Argo, Illinois has started a substantial plant expansion program including construction of three additional buildings and enlargement and modernization of other operating divisions. Plant premises have also been expanded by the purchase of another 80 acres of undeveloped land adjacent to the company property.

The Florida Citrus Mutual, a new central citrus marketing association, has been formed in Lakeland, Florida. The group intends to stabilize the state's citrus prices by regulating sales of canned products and f.o.b. sales of fresh fruit and volume control of fruit going to auction market.

The H. J. Heinz Co. is erecting a new one-story warehouse and office building in Jacksonville, Florida to supply the Heinz customers in that state.

International Fisheries Corp. has announced the establishment of a branch Research and Control Laboratory for vitamin oils, fish livers, and frozen fish at Marunouchi, Tokyo, Japan.

Lance, Inc. has recently opened a new Western Division Plant for the House of Lance in Greenville, Texas for the production of peanut butter sandwiches and other food products.



CARL C. BALDWIN

Formerly in charge of the Borden Company's condensed, evaporated, and dry milk production, Carl C. Baldwin of New York has been appointed production manager to supervise operations in all of the division's plants. Mr. Baldwin has been with the company for over 30 years and has served in various executive capacities for 17 years.

JOHN L. LOCKE

At present, secretary and general manager of Fisher Flouring Mills Co., Seattle, Washington, John L. Locke has accepted nomination to the presidency of Millers National Federation for a one year term. Upon his induction to office at the convention scheduled for May 10 to 12 in Chicago, Ill., Locke will become the 29th president of the Federation.

PERSONNEL

Carl C. Baldwin of New York has been appointed production manager of the Manufactured Products Division of the Borden Company. John Hunt, formerly Western Division manager with offices in San Francisco, was advanced to assistant production manager. Glen E. Lake and Carl Garlock, both formerly divisional production assistants in New York, were named assistants to the new production manager.

Louis Bisno, vice-chairman of the New York Section of the American Association of Cereal Chemists, and research director for the Wagner Baking Corp. has announced plans to resign from the company and move to the Los Angeles area. Mr. Bisno stated that the change was necessary because of a severe allergy to flour.

Dr. H. N. Brocklesby, research and technical director of the Borden Company, will head the newly organized research staff of Borden's soybean operations. He will be assisted by Dr. F. R. Murdock whose field is animal food products; John Cobler, on special oil products; and George H. Rowland on oil food products.

H. R. Cloud, of Orlando, Florida, vice-president and manager of the Plymouth plant of Vacuum Foods Corporation, has been named a director of the national company. John M. Fox, president of Vacuum Foods, also announced that J. Thomas Gurney of Orlando, was re-elected assistant secretary of the firm at a recent stockholders' meeting.

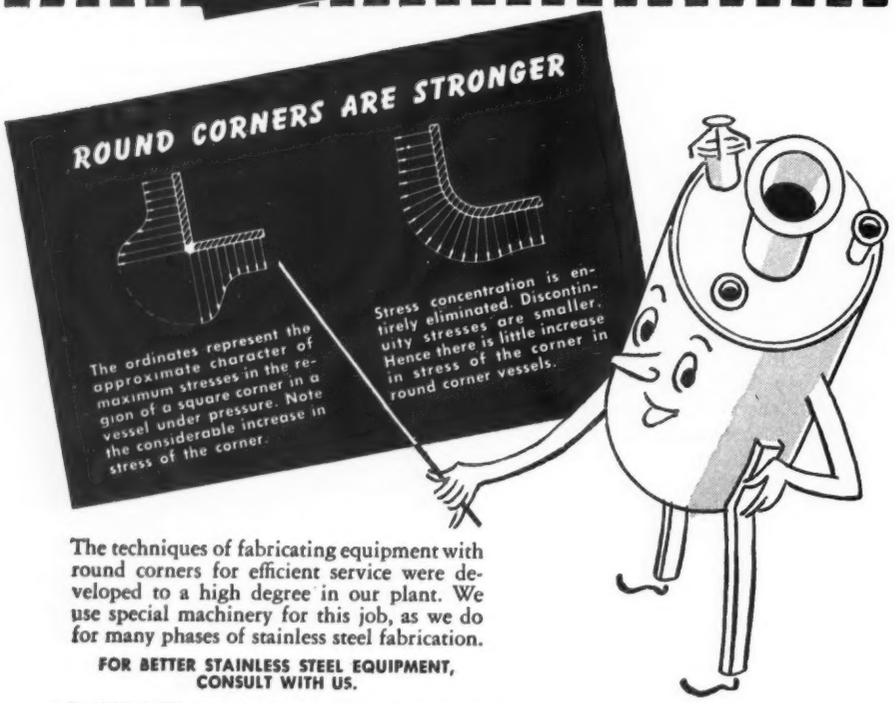
R. LAWTON HENDERSON

Filling the vacancy caused by the death of Mrs. Frank E. Lowenstein, the board of directors of Norris Exquisite Candies, Inc., elected R. Lawton Henderson president. Mr. Henderson began his career with the company in 1924 and had been previously vice-president and general manager.

WHY THEY BUILT ME WITH ROUND CORNERS

Advantages For Your Stainless Steel Equipment Revealed

ROUND CORNERS ARE EASIER TO CLEAN
Even the best brushes require extra time to clean accumulations gathered in square corners. With gummy material or material that hardens, complete removal may never be possible.
In Blickman round corner construction the brush has no difficulty in cleaning the entire surface of the round corner. This saves time and reduces the danger of contamination and corrosion.


ROUND CORNERS ARE STRONGER
The ordinates represent the approximate character of maximum stresses in the region of a square corner in a vessel under pressure. Note the considerable increase in stress of the corner.
Stress concentration is entirely eliminated. Discontinuity stresses are smaller. Hence there is little increase in stress of the corner in round corner vessels.

The techniques of fabricating equipment with round corners for efficient service were developed to a high degree in our plant. We use special machinery for this job, as we do for many phases of stainless steel fabrication.

FOR BETTER STAINLESS STEEL EQUIPMENT, CONSULT WITH US.

S. BLICKMAN, INC., 4104 GREGORY AVE., WEEHAWKEN, N. J.

S. BLICKMAN, INC.
Guards Alloys in Fabrication

SEND FOR THIS VALUABLE BOOK

A request on your letterhead will bring our guide, "What to Look For When You Specify Stainless Steel for Your Processing Equipment."

CORROSION RESISTANT PROCESSING EQUIPMENT

TANKS • KETTLES • STILLS • HEAT EXCHANGERS • AGITATORS • MIXERS • TOWERS • PIPING

NILES H. WALKER

Appointed new director of laboratories of Arnold Bakers, Inc., Niles H. Walker is also the chairman of the National Committee of the American Association of Cereal Chemists. Mr. Walker had been head of the analytical and control department of the general laboratories of the National Biscuit Company. In his new post he will head Arnold's expanding program of analysis, test, and research.

Capt. Thomas M. Davis, U. S. Air Force, has been assigned to the staff of Rations Planning Office, Quartermaster Food and Container Institute, Chicago, Illinois. He will conduct liaison activities between the Institute and Air Force of the Armed Forces, assisting and advising in ration development and service tests for feeding air force personnel.

James O. Dempsey, of the Dempsey-Hudson Packing Company, has been elected president of the Western Frozen Food Processors Association; Mel K. Spiegl, of Spiegl Foods Co., Inc., Vice-president; and C. J. Collins, of Frostcraft Packing Co., Treasurer.

Matthew J. Dillon of Newton Center, Boston Manager for General Seafoods Corporation, has been recently elected president of the Massachusetts Fisheries Association.

G. L. Elliott, former superintendent and assistant to the president of Derby Foods, Inc., has been elected president and general manager of the firm to succeed C. W. Beilfuss who retired February 1.

Lee Hickox, formerly head of the packaging Section, Military Planning Division, Office of the Quartermaster General, Washington, D. C., has joined the staff of Container Laboratories, Inc. His headquarters will be in the Chicago office.

James W. Mackey, of Framingham, Massachusetts, has joined the staff of the New England Bakers Association as assistant to Robert E. Sullivan, executive secretary and counsel.

New Ideas Today
Make Packaging Trends Tomorrow

Marathon invites visitors to the 1948 Packaging Exposition at Cleveland to visit our exhibit (Booth 405). The new packaging developments presented there will interest those men who are responsible for providing packaging to protect and merchandise America's foods. Marathon's facilities for research, development and manufacture of packages and packaging materials are widely diversified. Our products range across the entire food processing field.

SEE WHAT'S NEW IN PACKAGING FOR:

The Baking Industry . . . Rigid-Pak, a completely sealed carton for automatic packaging of cakes and quality specialties. See it at Cleveland.

The Frozen Food Industry . . . Marathon's immaculately white carton for automatic opening, filling, closing. Pictorially printed laminated over-wrappers. See it at Cleveland.

The Meat Packing Industry . . . The new Marathon carton (direct fill, no liner) for bulk sausage. Highly protective. A strong merchandiser. See it at Cleveland.

The Confectionery Industry . . . See Marathon's protective laminations for high-speed candy and gum package operations. Excellent roto printing on foils, cellophane or papers. See it at Cleveland.

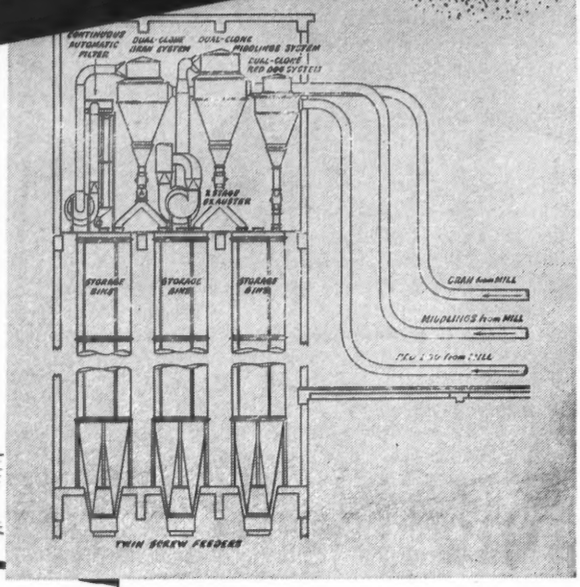
The "Pre-Mixed" Food Industry . . . Check Marathon's high protection wrappers, liners and packages. Special developments for use in protection of hard-to-keep food products. See it at Cleveland.

For details on any of these packaging developments, write direct to Marathon Corporation, Menasha, Wis.

MARATHON

PROTECTED BY MARATHON

Bulk Storage and Pneumatic Handling
Save Labor, Increase Flexibility



FLEXIBILITY is the keynote of the modernizing program at King Midas flour and feed mill at Hastings, Minn. Expanded bulk storage and pneumatic conveying provide clean, efficient handling and 100% daylight packing for their increased mill run.

For flour storage 20 new **DAY** bins 6′ in diameter and 69′ high have been installed. In addition, the capacity of 20 formerly installed **DAY** bins has been increased by adding 25′ to the height. Nine new **DAY** bins will handle feed storage in a new trackside addition to the mill to provide for daylight packing and bulk car-loading.

Conveyors Self-Cleaning and Adaptable

Three self-cleaning **DAY** pneumatic conveying pipes handle the material normally handled by 17 screw conveyors and 4 bucket elevators. Middlings, bran and red dog are carried in three streams to storage or packing. The pneumatic pipes require little space and can be run around any obstructions. At the bin tops **DAY** DUAL-CLONES separate the feed from the air, then continuous, automatic **DAY** Filters remove any fine particles carried over the DUAL-CLONES. Dust and waste are eliminated. The materials from the DUAL-CLONES discharge to any bin desired.

Maintenance Costs Cut

Bulk storage and pneumatic handling reduces maintenance and operating labor costs. With daylight packing, premium pay is avoided. By eliminating 21 mechanical handling units, with their drives, maintenance overhaul and repair costs are cut to the bone.

DAY Company assumed *complete* responsibility for engineering, manufacturing and installing the pneumatic handling and bulk storage equipment at King Midas. This included bins, chutes, pneumatic elevators, packers, feeders, etc. Their services are available for engineering pneumatic handling and Dust Control systems for your plant.

*Write-to-***DAY**

The DAY Company

SINCE 1881

817 3rd Avenue N. E., Minneapolis 13, Minn.

IN CANADA: P. O. Box 70D, Ft. William, Ont.

Representatives in principal cities

WATSON H. VANDERPLOEG

At the February meeting of the Board of Directors, Watson H. Vanderploeg was elected a Director of Libby, McNeil & Libby, food canners. Mr. Vanderploeg is President of the Kellogg Co., Battle Creek, Michigan.

Robert V. Mellefont of Washington, D. C., has been elected full-time treasurer of the American Chemical Society. Mr. Mellefont was formerly vice-president and cashier of the National City Bank of Washington.

Richard T. Riney, president of Sterling Brewers, Inc., of Evansville, Indiana, was elected Secretary of the U. S. Brewers Foundation at a recent Board of Directors meeting in Philadelphia.

Clyde Underwood, formerly assistant manager of Fairmont Foods Co., Lincoln, Nebraska has been made plant manager to succeed Merrill G. Koser who was transferred to the company's Buffalo, N. Y. branch.

FRED E. WRIGHT, JR.

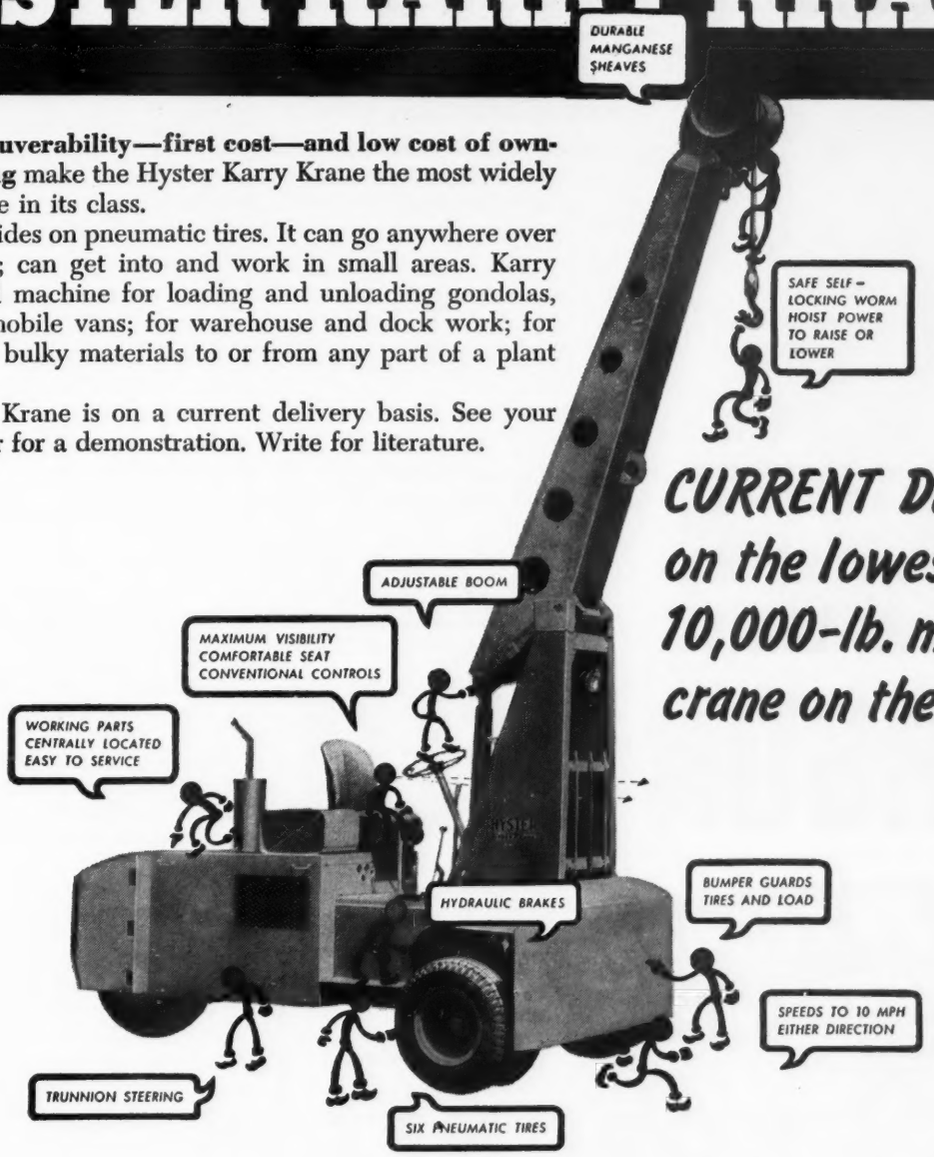
With a background of 26 years experience in the marketing of food products, Fred E. Wright, Jr., has joined Carr-Consolidated Biscuit Co. as Eastern Division Sales Manager. Since 1936 Mr. Wright has been associated with American Home Foods, Inc.

HYSTER KARRY KRANE

Mobility—Maneuverability—first cost—and low cost of owning and operating make the Hyster Karry Krane the most widely used mobile crane in its class.

Karry Krane rides on pneumatic tires. It can go anywhere over any road surface; can get into and work in small areas. Karry Krane is an ideal machine for loading and unloading gondolas, flat cars or automobile vans; for warehouse and dock work; for moving heavy or bulky materials to or from any part of a plant or storage yard.

Hyster Karry Krane is on a current delivery basis. See your Hyster distributor for a demonstration. Write for literature.


DURABLE MANGANESE SHEAVES
SAFE SELF-LOCKING WORM HOIST POWER TO RAISE OR LOWER
ADJUSTABLE BOOM
MAXIMUM VISIBILITY COMFORTABLE SEAT CONVENTIONAL CONTROLS
WORKING PARTS CENTRALLY LOCATED EASY TO SERVICE
HYDRAULIC BRAKES
BUMPER GUARDS TIRES AND LOAD
SPEEDS TO 10 MPH EITHER DIRECTION
TRUNNION STEERING
SIX PNEUMATIC TIRES

CURRENT DELIVERY on the lowest price 10,000-lb. mobile crane on the market

SOLD AND SERVICED BY THESE HYSTER DISTRIBUTORS

ALASKA—Northern Commercial Co.
BROOKLYN, N. Y.—A. S. Rampell
BUFFALO, N. Y.
Rapids Handling Equipment Co. of Buffalo, Inc.
CALGARY, ALTA.
A. R. Williams Machy. Western, Ltd.
CHICAGO, ILL.—Hyster Company
CINCINNATI, O.—Oral T. Carter & Associates
CLEVELAND, O.—Morrison Company
DALLAS, TEX.—C. H. Collier Company
DENVER, COLO.—Paul Fitzgerald
DETROIT, MICH.—Bentley & Hyde
GRAND RAPIDS, MICH.—Bentley & Hyde
HALIFAX, NOVA SCOTIA
A. R. Williams Machy. Co. Ltd.
HONOLULU, T. H.—Electric Steel Foundry Co.
HOUSTON, TEXAS—C. H. Collier Company
INDIANAPOLIS, IND.
Central Rubber & Supply Co.
JACKSONVILLE, FLA.—L. S. Teague Eqpt. Co.
KANSAS CITY, MO.
Industrial Power Equipment Co.
LOS ANGELES, CALIF.—Hyster Company
LOUISVILLE, KY.—Embry Brothers, Inc.
MEMPHIS—Hyster Co. of Louisiana, Inc.
MILWAUKEE, WIS.—Hyster Company
MINNEAPOLIS, MINN.—W. S. Nott Company
MOBILE, ALA.—S & T Equipment Co., Inc.
MONTREAL, P. Q.
A. R. Williams Machy. Co., Ltd.
NEW ORLEANS, LA.
Hyster Company of Louisiana, Inc.
NEW ROCHELLE, N. Y.
Eastern Industrial Sales Co.
OTTAWA, ONT.
A. R. Williams Machy. Co., Ltd.
PHILADELPHIA, PA.
Rapids Handling Equip. Co. of Phila., Inc.
PHOENIX, ARIZ.—Equipment Sales Company
PITTSBURGH, PA.—Equipco Sales Company
PORTLAND, ORE.—Hyster Sales Company
ST. JOHNS, N. F.—City Service Company, Ltd.
ST. LOUIS, MO.—Wharton L. Peters
SALT LAKE CITY, UTAH
Arnold Machinery Company
SAN FRANCISCO, CALIF.—Hyster Company
SEATTLE, WASH.—Hyster Company
TORONTO, ONT.
A. R. Williams Machy. Co., Ltd.
VANCOUVER, B. C.
A. R. Williams Machy. Western, Ltd.
VICTORIA, B. C.
A. R. Williams Machy. Western, Ltd.
WINNIPEG, MAN.
A. R. Williams Machy. Western, Ltd.
YUKON TERRITORY
Northern Commercial Company

HYSTER COMPANY

THREE FACTORIES
2902-35 N. E. Clackamas, Portland 8, Ore.
1802-35 North Adams St., Peoria 1, Illinois
1010-35 Meyers Street, Danville, Illinois

In addition to above, Hyster Export Dealers are located in 30 foreign countries.

40% Less Machining with **E-Z-CUT PLATES**

. . . in Stock for Immediate Shipment

Especially well suited for die bases, jigs, and other applications where considerable machining is involved, E-Z-Cut plates machine smoothly at higher speeds, with less tool wear. Other E-Z-Cut advantages: They case harden to extreme surface hardness with even gradation of carbon from case to core. Weld easily. To save with E-Z-Cut, call, wire or write the nearest Ryerson plant for quick service.

JOSEPH T. RYERSON & SON, INC., Steel-Service Plants at: Chicago, Milwaukee, Detroit, St. Louis, Cincinnati, Cleveland, Pittsburgh, Philadelphia, Buffalo, New York, Boston, Los Angeles.

Bars • Structurals • Plates • Sheets
Mechanical Tubing • Boiler Tubes
Allegheny Stainless • Alloys • Tool Steel
Safety Floor Plate • Reinforcing Bars
Babbitt • Bolts • Rivets • Metal Working Tools & Machinery, etc.

RYERSON STEEL

USED BY LEADERS IN THE INDUSTRY

Complies Fully With All The Provisions of The Pure Food Act

KORONET HAIR GUARDS FOR WOMEN AT WORK

Koronet Hair Guards allow for natural sanitary air circulation. Smart, neat and decorative—comfortable, light and snug fitting—adjustable to any head size and all hair styles. Maximum protection against loosened hair falling or getting caught. Strong, durable, neatly webbed net and non-inflammable glossy plastic shield —wipes clean with damp cloth.

Some Newest Users

- Kellogg Co.
- Beatrice Food Co.
- Swift Co.
- Best Foods
- General Mills, Inc.
- Monarch Finer Foods
- H. J. Heinz Co.
- Hi-Hat Food Products
- Rutherford Co.
- Ed Martin Sea Food Co.
- San Xavier Fish Pack. Co.

Added Advertising Value

Any trademark, name or slogan can be imprinted on the shield in color.

FREE SAMPLE

Write Dept. F.I.-4 today for free sample, literature and prices.

REGAL MFG. CO. 3203-05 ELSTON AVE. CHICAGO 18, ILLINOIS

ASSOCIATED INDUSTRIES

Container Corp. of America's new folding carton plant at Greensboro, North Carolina, begun in 1946, is now in limited operation. This is the company's first fabricating plant built to specifications, and is reported to be a model of modern industrial architecture.

Dewey & Almy Co. has recently purchased a building in Lockport, N. Y. for the manufacture of plastic bags to be used in packing frozen foods.

The Dixie Paper Co., Dallas Texas, recently celebrated its twenty-fifth anniversary. The firm started with a staff of four and has now expanded to serve all 48 states and Canada.

Food Machinery Corp. has purchased the Grabill Manufacturing Co. of Woodstock, Virginia. Food machinery will continue to manufacture the apple packing equipment made popular by Grabill and will expand the list of packing house products to be built.

Lukens Steel Co., Coatesville, Pennsylvania announced the election of Charles Lukens Huston, Jr. as vice-president and Robert G. Bloom as controller.

The Association of American Soap & Glycerine Producers announced the retirement of Roscoe C. Edlund, who for 21 years had been Manager and Secretary of the Association.

Eastern Stainless Steel Corp., Baltimore, Maryland, has named Robert F. Johnston Assistant General Sales Manager.

DEATHS

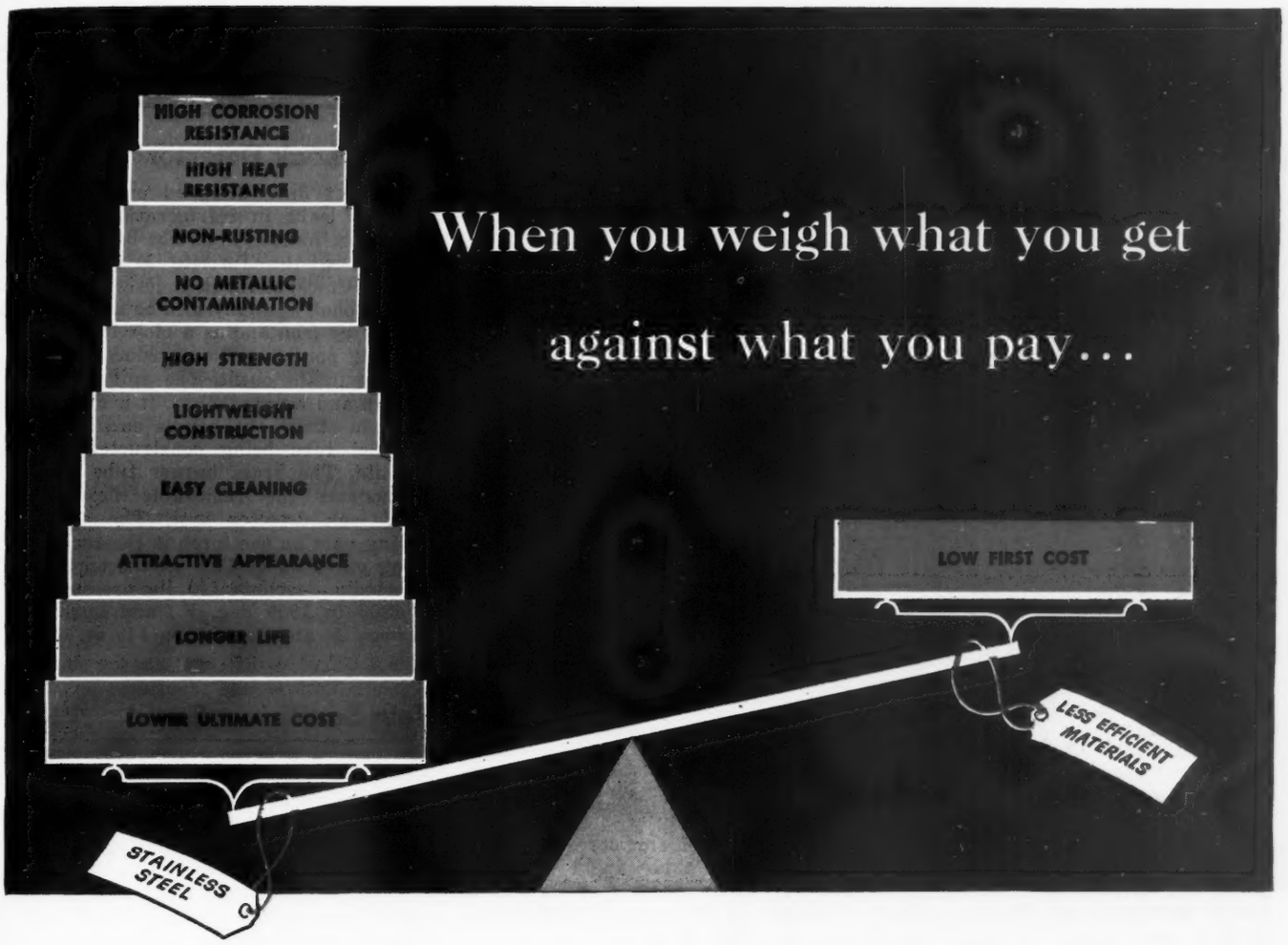
Francis E. Barbour, 77, chairman of the board of the Beechnut Packing Co. in Canajoharie, N. Y., February 4th.

Fred M. Kaiser, Sr., 76, founder of Eastern Packing Company, Decatur, Illinois, at Sarasota, Florida, February 6th.

W. Harold Miller, 58, Syracuse, N. Y., manager of the Ontario Biscuit Co., after an extended illness at his home February 11th.

M. Vincent O'Shea, Jr., 49, administrative vice-president of Merck & Co. Inc., in New York City, February 5th.

James Stoops, 79 founder of Stoops Packing Co. and an organizer of the Ohio Canners Association, after an extended illness at home, February 7th.



the balance is in favor of STAINLESS equipment

MATERIALS less efficient than Stainless Steel have in their favor only one advantage—lower first cost. Against this Stainless offers ten advantages.

That's why Stainless Steel does so much more, does it so much better and lasts so much longer. That is why so often Stainless is by far the cheapest material you can use.

The way Stainless Steel safeguards food purity, eliminates losses caused by metallic contamination—the lower cleaning costs its use ensures—the time wasting equipment shut-downs it avoids where ordinary materials fail under corrosive attack—the labor it saves by saving weight in equipment that must be moved—the longer service life, fewer repairs and minimum maintenance that result from Stainless Steel's superior physical properties—all these far outweigh its sometimes higher cost.

These proved, money-saving advantages of Stainless you can obtain at their fullest in U·S·S Stainless Steel.

In U·S·S Stainless Steel we can offer you — *for almost immediate delivery*—a complete family of perfected, service-tested corrosion- and heat-resisting steels in a wide variety of forms, sizes and analyses. Plan to use them to improve your product or equipment. Our engineers who are specialists in the use of Stainless Steel will gladly recommend what grade to use and show you the best way to obtain optimum benefits at minimum cost. Ask for their assistance at any time.

USS STAINLESS STEEL — UNITED STATES STEEL

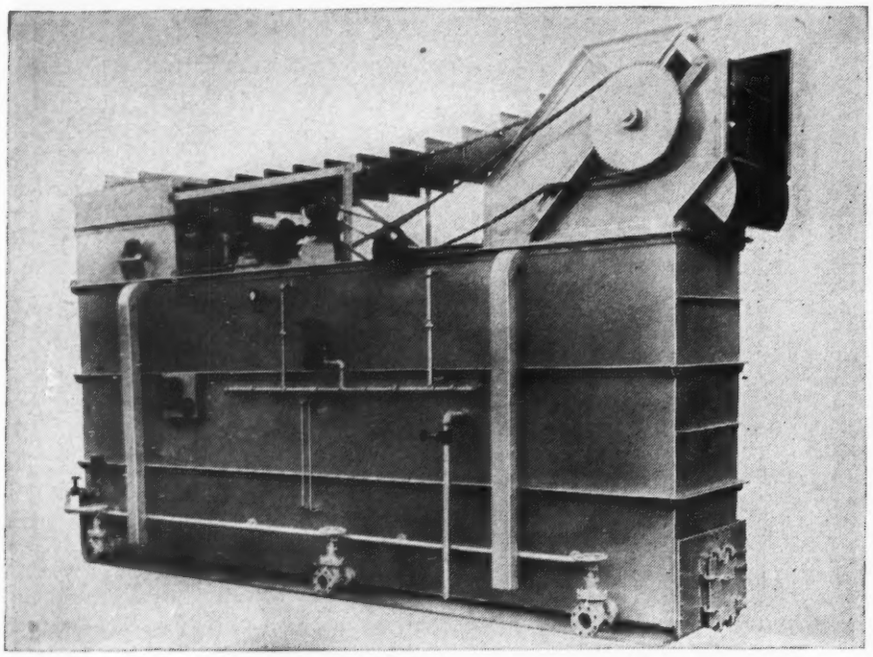
U·S·S STAINLESS STEEL

SHEETS · STRIP · PLATES · BARS · BILLETS · PIPE · TUBES · WIRE · SPECIAL SECTIONS

8-512-A

UNITED STATES STEEL AMERICAN STEEL & WIRE COMPANY, Cleveland, Chicago & New York
CARNEGIE-ILLINOIS STEEL CORPORATION, Pittsburgh & Chicago • COLUMBIA STEEL COMPANY, San Francisco
NATIONAL TUBE COMPANY, Pittsburgh • TENNESSEE COAL, IRON & RAILROAD COMPANY, Birmingham
UNITED STATES STEEL SUPPLY COMPANY, Warehouse Distributors—Coast to coast: UNITED STATES STEEL EXPORT COMPANY, New York

FOOD EQUIPMENT NEWS



Continuous Scalder for Root Vegetables 1

LARGE tonnage, causticless scalding of beets, white potatoes, sweet potatoes and carrots, by carefully controlled movement of the vegetables through hot water, live steam and hot water again, is claimed for a continuous scalder made by the Allan Iron & Welding Works, Inc., Dept. I, Rochester 6, N. Y. Movable flights carry the vegetables into a section containing hot water, where they are properly heated and moistened before exposure to live steam. After leaving the steam chamber, the vegetables again pass through hot water to restore lost moisture content. Scalding cycle time can be varied to suit vegetable characteristics. Water is heated by live steam that also provides make-up water.

To simplify cleaning, access doors are provided at each end and in one side of the scalder. Operation is continuous and automatic. After washed and graded vegetables pass through the scalder, they are discharged directly into the rotary peeler. Hourly capacity: Beets, 6 tons minimum; potatoes and carrots, 12-18 tons. Size: 24 x 5 x 15 ft. high.

Halide Leak Detector 4

A COMPACT unit, designed primarily to locate leaks in refrigeration systems using halide gases, has been announced by the Justrite Mfg. Co., Dept. I, Chicago, Ill. It is designed to burn alcohol, and may also be used as a soldering iron and as a blow torch—soldering point and flame reducer are included in the outfit. The unit is 11 in. high and weighs 1¾ lb. It is cylindrical in shape—the handle enclosing the fuel tube being constructed of Bakelite. The brass burner tube accommodates the removable flexible metal leak detector hose. The only moving part on the torch is the regulating valve knob. This leak detector reportedly develops 140 lb. pressure at 1800 to 1900 deg. F., and burns between 20 and 45 min. on 1½ oz. of fuel.

New Sanitizing Agent 5

RODACIDE, a produce which combines the highly effective germicidal and fungicidal properties of a quarternary ammonium compound with a compatible non-ionic detergent to make sanitizing and cleaning easier and more effective is manufactured by Fairfield Laboratories, Inc., Plainfield, N. J. Cetyl dimethyl ethyl ammonium bromide, the active germicidal agent used has a phenol coefficient of 275-300 against *staphylococcus aureus* and 225-250 against *eberthelia typhosa*. This product is ideal for general cleaning of refrigerators, walls, floors and food storage areas. It makes an excellent liquid handsoap for use in public buildings, industrial plants and home.

Adjustable Air Diffuser 2

AN air diffuser which provides any desired air-flow pattern by varying the vertical position of the third cone at the turn of a knob has been announced by the Anemostat Corp., Dept I, New York 16, N. Y. It utilizes the Anemostat aspiration principle which draws room air into the device and mixes it with supply air.

Portable Mixer 3

A 3-SPEED portable mixer, which will take care of all mixing, blending and agitating problems—whether the tank is below, level with or above floor level—is made by Consolidated Siphon Supply Co., Inc., Dept. I, New York 13, N. Y. Mixer does not clamp to tank but rests upon stand. Both propeller shaft and stand are adjustable, permitting unlimited settings. All parts that touch product are stainless steel. Standard belt drive permits propeller speeds of 175, 325 and 575 rpm.

Continuous Pressure Toaster for Soybeans 6

A PRESSURE toaster or cooker of continuous type for use in heating, cooling or otherwise treating large quantities of materials under pressure is announced by Blaw-Knox Co., Dept. I, Pittsburgh, Pa. It was developed for and is now used by the soybean processing industry, but it is expected to find wide application in other fields. In the unit, a horizontal, cylindrical shell rotates inside a pressure chamber. Feed and discharge are accomplished through barrel valves of special design that allow continuous charging and discharging at pressure up to 15 psi.

Continuous Fryer 7

CONTINUOUS automatic deep fat frying of potato chips, sticks and French fried cuts, fish cakes, clams, lobsters, mussels or doughnuts, is now possible with a deep-fat frying machine made by Maddocks Potato Products, Inc., Dept. I, Charlestown, Mass. Having an hourly capacity of over 800 lb. of shoestring potatoes and over 1,000 lb. of chips, the machine is simplified so that it requires only conveyors to feed the raw products and take away the finished ones. Other advantages claimed for the machine are: Greatly reduced fat absorption; the same frying time and temperature for each piece.

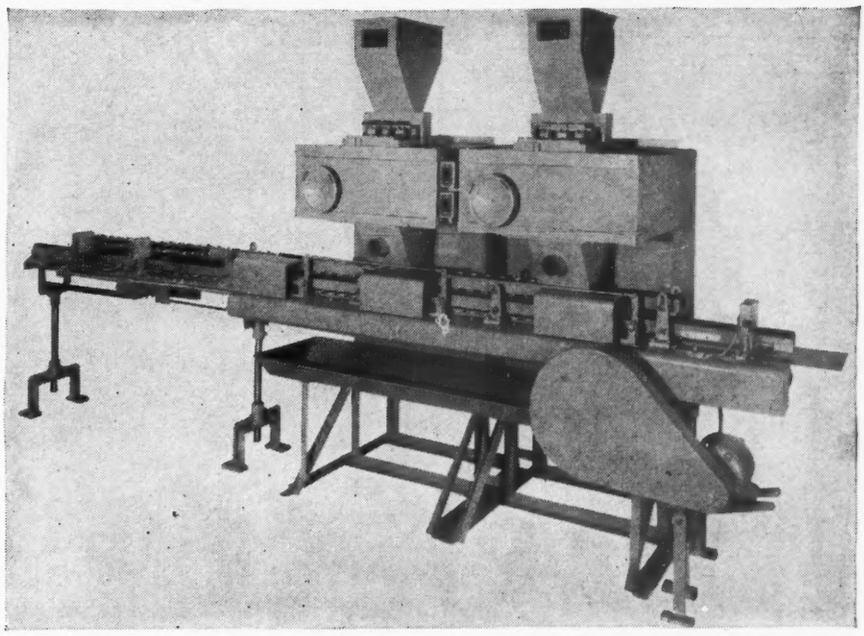
Hand-Held Tachometer 8

A NEW hand-held electric tachometer which weighs only 3 lb. has been announced by the Special Products Div. of General Electric Co., Dept. I, Schenectady 5, N. Y. It is designed to give accurate and direct reading of linear speeds from 10 to 10,000 fpm., and of rotational speeds from 100 to

10,000 rpm. It consists of two units: the head, which is placed in contact with the moving object, and the indicating unit to which the head is attached by a flexible electric cable. Vibration from the rotating machine does not affect the reading or make the instrument difficult to read.

Electronic Speed Control 9

To provide excitation and speed control of boiler draft fans and centrifugal pumps, compressors and blowers on which the Magnetic Drive is used, Electric Machinery Mfg. Co., Dept. I, Minneapolis 13, Minn., announces the Regutron. It rectifies 3-phase supply current to energize Magnetic Drive, and adjusts value of current to hold operating speed of load to within plus or minus 1 per cent of selected speed. Speed of the load is selected by automatic or manual positioning of a small potentiometer. Since excitation current from the Regutron is balanced against the voltage from a tachometer generator belted to the load, speed is held constant despite variation in prime mover speed or changes in load or voltage.



Measures and Dispenses 240 Packages per Minute 10

A VOLUMETRIC type filling unit, for packing products such as beans, sugar and salt, and granular type chemicals, at speeds up to 240 per min. has been developed by Triangle Package Machinery Co., Dept. I, Chicago 51, Ill. The unit consists of two Model CV-6 "Elec-Tri-Pak" volumetric fillers working together on a single automatic conveyor. Each machine has a total of 6 cups, so arranged that adjustment for increasing or decreasing their capacity is permitted during operation. The cups are arranged in two rows that reciprocate back and forth for filling and discharging. A single filler has a capacity up to 120 containers per min. By synchronizing the two machines a total production of 240 packages per min. is obtained. Size of unit: 3½ x 2 x 7 ft. high. It is operated by a ¼ hp. motor.

Turbidity Indicator 11

A RECORDER for measuring various undissolved substances or emulsions present in solutions is announced by the Ess Instrument Co., Dept. I, Bergenfield, N. J. The instrument comprises a viewing chamber through which the solution to be measured is passed. Attached to one end is a light source, and the other a photo relay unit. The output from the photo relay unit is then connected to a potentiometer recorder which gives a continuous record of the condition of turbidity. The instrument may be equipped with warning lights or electrical control points. Available in range of 0 to 3; 0 to 50; 100 ppm. and up.

Flow Rate Slide Rule 12

THE Foxboro Flow-Rule is a specially designed 12 in. slide rule for computing orifice plate bores, flow nozzles or Venturi throats, and also the rate of flow, or the differential created across the orifice plate or other primary device. It can be used for all fluids, with or without seals, and covers such a wide range of flows and line sizes that it will handle almost any commercial problem. It is not intended to replace computation methods where purchase and sale of fluids are involved. It will, however, be found invaluable for checking such calculations. The Flow-Rule is made by The Foxboro Co., Dept. I, Foxboro, Mass.

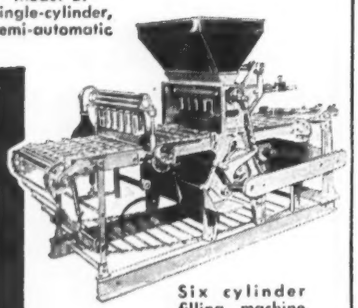
HOW TO GET THIS LITERATURE

Food Industries Reader Service now supplies tear-out coupon cards for your convenience in requesting copies of these new publications from manufacturers. Use one or more of the cards on the colored sheet bound near this page. Fill out, tear out, mail out and the Reader Service staff will see that your requests reach the manufacturers.

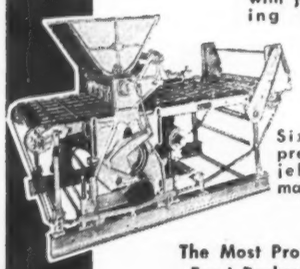
GEYER
SINCE 1914
"WE'VE PACKED THEM IN FOR YEARS"

Fillers are straight line with multiple cylinders . . . designed for CLEAN CUT OFF FILLING for products that seek their own level . . . BOTTOM UP FILLING for semi-solids . . . No drip . . . Clean Filling . . . Entirely automatic . . . Readily adjustable to any size or shape container . . . Maximum production output.

Model B. Single-cylinder, semi-automatic



Six cylinder filling machine with jar cleaning device.

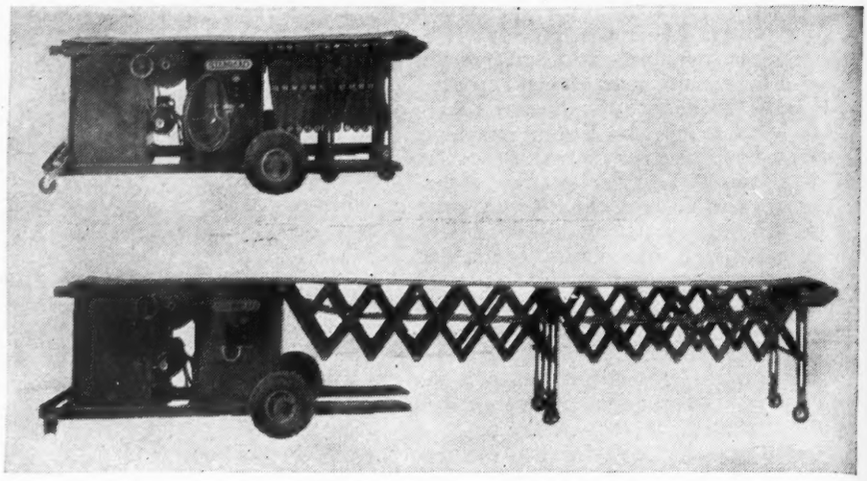


Six cylinder preserve and jelly filling machine.

The Most Prominent Food Packers Use Geyer Filling Machines

JAMS	LACQUER
SYRUP	MAYONNAISE
JELLIES	PEANUT BUTTER
CHEESE	APPLE BUTTER
GLUE	VANISHING CREAM
PASTE	MUSTARD AND
GREASE	SIMILAR PRODUCTS

THE FILLER MACHINE CO. INC.
1248 E. MONTGOMERY AVE., PHILA., PA



Portable Conveyor Extends to 46 Ft. 13

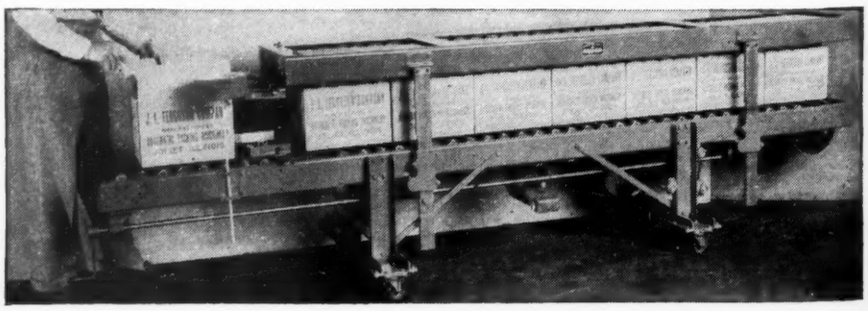
AN entirely new type of portable belt conveyor, whose short closed length permits moving through confined areas or aisles to any part of the plant or warehouse where there is a conveying job, is made by Standard Conveyor Co., Dept. I, No. St. Paul 9, Minn. The unit will convey sacks, cartons, cases, or bags any horizontal distance up to 46 ft. in either direction. It can be extended or retracted to any distance between its maximum and minimum or closed length, as the conveying problem requires. Since the conveying means is a traveling belt, it can be put into immediate action without bothering about slope or coupling sections together, as must be done for gravity operation of wheel or roller conveyors. It can be used on a loading dock and be extended into a trailer truck, a distance of 35 ft. without affecting the portion of the conveyor on the dock. Extendable parts pivot at each support, permitting declines or inclines.

Vertical Boiler Pumps 14

A SERIES of boiler-feed pumps designed especially for pumping hot water and for other installations requiring high water pressures, said to be the first produced in a vertical design, is announced by Jacuzzi Bros., Inc., Dept. I., Richmond, Calif., and St. Louis, Mo. This design cuts floor space to a minimum and does away with the need for special foundations or flexible couplings. It means higher efficiency and less maintenance, because the pumps have only one moving part and no close clearances. Units vary in size from ½ to 20 hp.

Hot Wire Tube Cutter 15

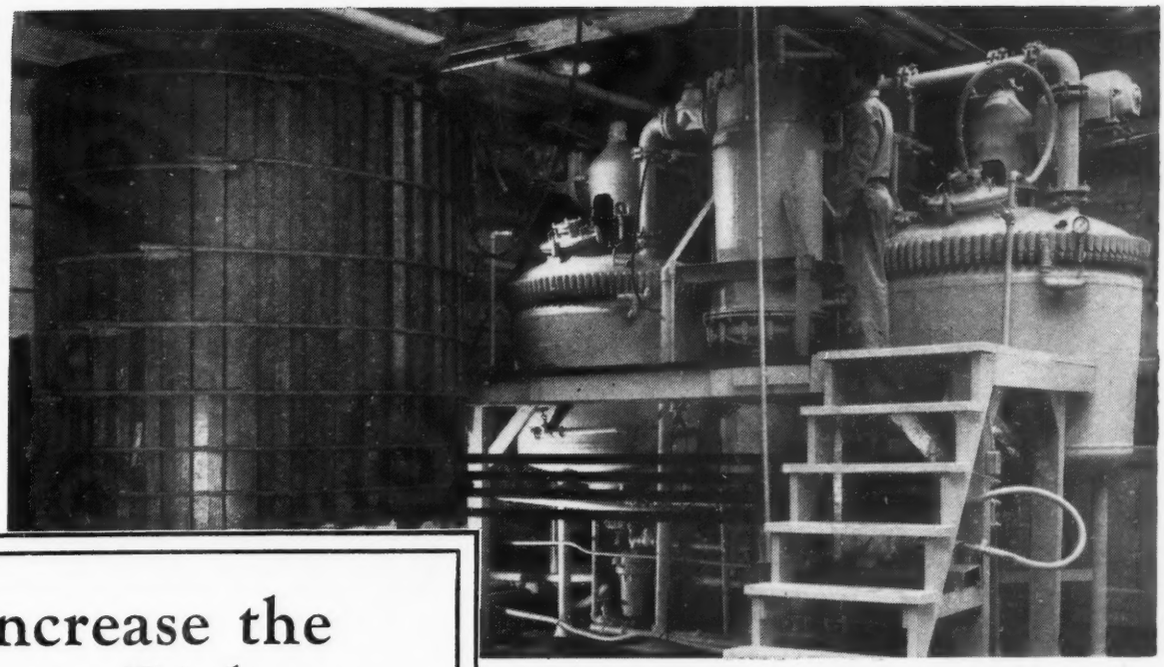
A HOT wire glass cutting unit that will cut tubing up to 7½ in. outside dia., in any position, as a separate piece or as an integral part of apparatus already set up, is announced by Eberbach & Son Co., Dept. I., Ann Arbor, Mich. Adjustable supports are provided for the unit and tubing when individual pieces are to be cut. When supports are removed, unit can be used in any position. Power for the variable length cutting wire is supplied by a special power unit equipped with a meter that enables operator to balance output with length of wire.



Semi-Automatic Hand Gluer-Sealer 16

A NEW Packomatic semi-automatic gluer-compression sealer designed particularly for handling small daily runs, or for situations where total volume does not justify an investment in automatic equipment, is announced by J. L. Ferguson & Co., Dept. I, Joliet, Ill. Unit is equipped with roller feed table, glue pot and brush for manual application of adhesive. After applying glue and closing flaps, operator starts cases between intermittently operated belts, controlled by automatic start-and stop mechanism.

Unit is furnished in varying lengths from 6 to 24 ft. Handles cases 5 x 6 x 4 to 30 x 18 x 19 in.



One unit of two reaction kettles, condenser, and storage tank used by Griffith Laboratories in hydrolyzing proteins at Newark. Reprint of article published by Food Industries about the complete process available upon request.

Increase the Flavor-Richness of Your Products with VEGAMINE

★

GRIFFITH'S PROTEIN HYDROLYSATE—
Rich Source of Mono Sodium Glutamate

★

Discover *how much* the flavor of your food products can be *enriched* or fortified by adding VEGAMINE. "Thin-flavored" foods *must be*—to stand a chance in today's market.

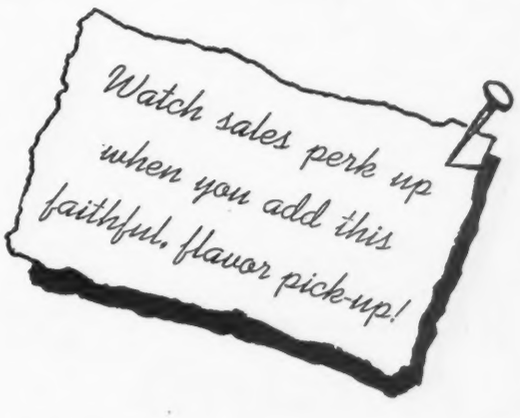
VEGAMINE contains *all* the flavor of *all* the Amino Acids . . . more *natural* flavor than single Amino Acid Salts. No scorched or burnt taste . . . just that rich, satisfying flavor Griffith derives by hydrolyzing the right combination of proteins. And more Amino Acid flavor per pound!

Bacteriologically safe, VEGAMINE can be tried with assurance that its quality and uniformity is laboratory controlled and guaranteed. Can ship immediately.

Your inquiry will be answered promptly.

FLAVOR FORTIFIER for . . .

Bouillons	Processed Meat
Bouillon Cubes	Sausage
Cheese Spreads	Mince Meat
Chili Sauce	Scrapple
Chop Suey Sauce	Stews
Gravies	Soups
Hash	Baked Beans
Spreads	Spaghetti



The GRIFFITH LABORATORIES

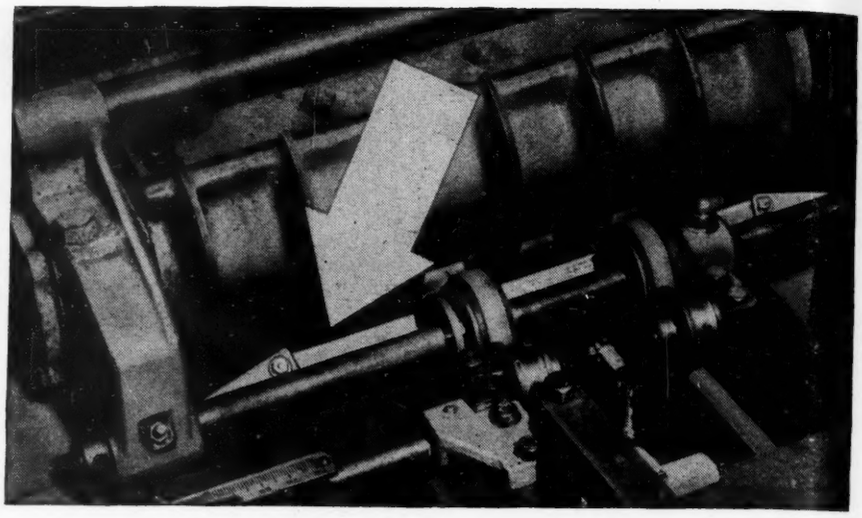
CHICAGO 9, 1415 W. 37TH ST. • NEWARK 5, 37 EMPIRE ST. • LOS ANGELES 11, 49TH & GIFFORD STS. • TORONTO 2, 115 GEORGE ST.

FERRY CONTINUOUS POTATO CHIP MACHINE

is completely automatic! Automatic from raw, unpeeled potatoes to finished product. Peeling, slicing, washing, drying, frying and salting . . . all are under perfect control. You can't beat a Ferry Potato Chip Machine.

Also makers of
SLICERS AND AUTOMATIC SLICERS, FEEDERS AND CAN WASHING MACHINERY

J. D. FERRY CO.
129 SO. CAMERON ST.
HARRISBURG, PA.

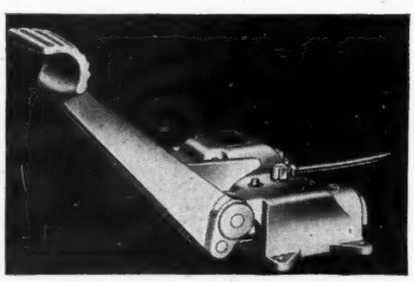


Device Eliminates Static on Wrapping Machines 17

A STATIC eliminator which, when installed on a wrapping machine, will prevent uncomfortable electric shocks to operators, sparking and sheet-handling difficulties, is manufactured by the U. S. Radium Corp., Dept. I, New York 7, N. Y. Operation of the Ionotron, as it is called, involves no electric power use, no gas flame, no maintenance cost. It consists of a shielded bar supporting a strip of radio-active material, at the point on the machine where static charges tend to build up. The air at this point is ionized by the alpha rays from the radioactive source, and acts as a conductor to draw off the charges as generated.

Hydraulic Foot Pump 18

A SMALL, compact, lightweight hydraulic foot pump, designed so that the pedal return spring is built inside the pump body and the release controlled by slightly raising the single pump pedal, has been introduced by the Lyon-Raymond Corp., Dept. I.

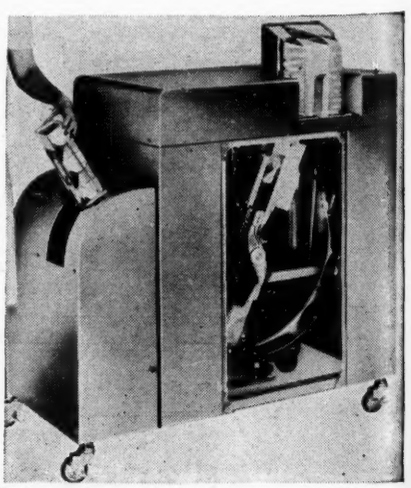


Greene, N. Y. Working pressures up to 1,500 psi. can be obtained with this model that weighs only 13¼ lb. The usable oil capacity is 15 cu. in., the oil being contained in a sealed reservoir requiring no vent. The flat base has 3 bolt holes for easy mounting. Special features include a built-in oil strainer, an adjustable relief valve and a chrome plated piston for smooth long-life operation.

Forms Ice Cream Cartons 19

AN ice cream carton setup machine, that automatically squares the carton, closes and locks the flaps of one end, turns out the flaps of the open end and delivers the carton ready for filling, is manufactured by the Mechanical Division of General Mills, Inc., Dept. I, Minneapolis 1, Minn. The unit was designed by Frank D. Palmer, Inc., Chicago, and is said to be the first machine in an automatic packaging line. Later additions will be a carton closer and an ice cream filler. It will handle only No. 2 linerless, lock-type cartons.

A bundle of flat cartons is placed in the feed hopper. By means of a vacuum pickup, individual cartons are transferred to a holding and forming bucket that squares them and plows the flaps into arrangement locking the outer flaps. The carton is ejected from the moving bucket and carried to the flap breaking station where the flaps on the open end are turned outward. The carton is then delivered for filling. All parts of the machine contacting cartons, and side panels, are of stainless steel. Unit is equipped with single phase, fractional hp. motor. Size 2 x 3 x 4 ft. high.



NEW STANDARD OF THE HIGHWAY

THE NEW INTERNATIONAL KB-8-1

★ Speeds Deliveries

★ Takes Hills Faster

★ Hauls More Net Payload

THE KB-8-1—READY FOR THE ROAD—Engine: International Red Diamond 401; brake HP 140. **Wheelbase:** 137, 149 and 161 inches. **Transmission:** 5-speed, over-drive or direct in fifth. **Rear Axle:** Single-speed or two-speed. **Brakes:** Heavy-duty, extra-capacity, hydraulic, hydrovac actuated, or air brakes. **Fuel Tank:** Large capacity, safety type. **Generator:** 300-watt, 6-volt for fast charging. **Cab:** International; seat and back adjustable; sponge rubber cushions; dual windshield wipers; tachometer; marker lights; hand-control valve and connections for semi-trailer brakes. **Tires:** 10.00 x 20.

THE NEW INTERNATIONAL KB-8-1 is just one in a long list of answers International provides for today's truck transport problems—answers that speed deliveries, cut transport costs and improve traffic conditions.

★ The KB-8-1 speeds over-the-highway deliveries. Shipper, consignee, consumer and operator benefit.

★ It has the extra power to climb hills faster and maintain rigid schedules.

★ It carries more net payload without exceeding its gross weight rating than trucks with the same power but more chassis weight.

International Trucks are completely co-ordinated to the work they do. They're performance-co-ordinated with *specialized* engines, transmissions and axles. They're load-co-ordinated by the exclusive International Truck Point Rating System.

Right now International Dealers and Branches are equipped for expert application of all benefits the new KB-8-1 brings.

And there is an equally efficient International for all other truck jobs.

Motor Truck Division
INTERNATIONAL HARVESTER COMPANY
180 North Michigan Avenue Chicago 1, Illinois

Tune in James Melton on "Harvest of Stars." CBS Wednesday Night.

THIS EMBLEM IDENTIFIES GREAT TRUCKS
INTERNATIONAL

INTERNATIONAL Trucks

Guardians OF THE NATION'S FOODS

DETROIT
1448 WABASH AVE.
ZONE 16

CHICAGO
2101 W. PERSHING RD.
ZONE 9

UNITED STATES COLD STORAGE

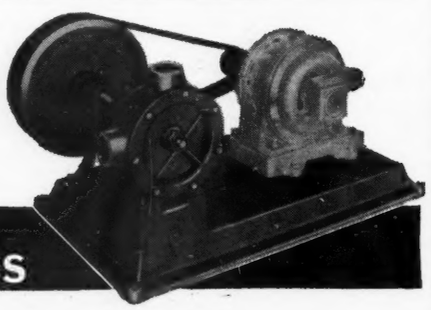
Four Modern Fortresses For Guarding The Nation's Foods

DALLAS
1114 WOOD STREET
ZONE 2

WRITE FOR DETAILS

KANSAS CITY
500 EAST THIRD ST.
ZONE 6

Vikings



ARE BUILT FOR YOUR PUMPING JOBS

There is no general compromise when Vikings go in on the job. Correct design, size, construction, material, speeds, power, etc., are basic factors in furnishing correct equipment for any pumping job.

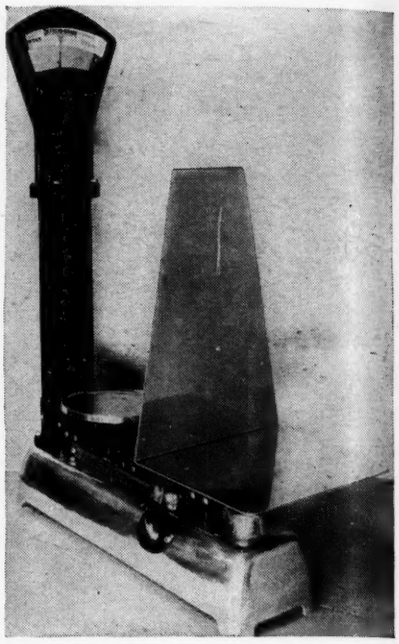
See that your pump meets these requirements. Insist on Vikings—the pump that is built for the job from start to finish. It's the standard in rotary pumps for over a third of a century.

Write today for folder 100E. It will be sent free by return mail.

VIKING PUMPS
VIKING PUMP CO.
CEDAR FALLS IOWA

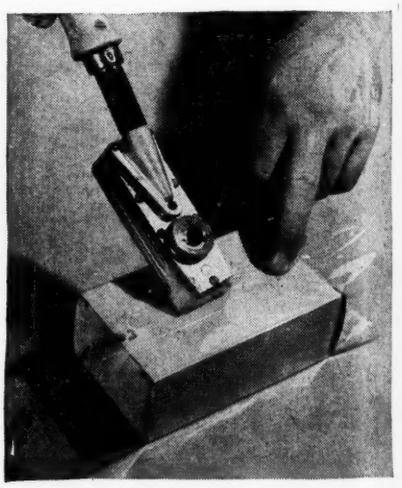
See Our Catalog In SWEETS

Viking PUMP COMPANY
Cedar Falls, Iowa



Heavy-Duty Speed Scale 20

A NEW heavy-duty type Detecto-gram aluminum speed scale has been announced by Detecto Scales, Inc., Dept. I, Brooklyn 1, N. Y. Especially constructed to speed up packing and processing operations, the new scale has a capacity of 20 to 30 lb., and a precision accuracy to ¼ oz., with beam graduations reading up to 1 lb. It is equipped with an 8x10x14-in. commodity plate.



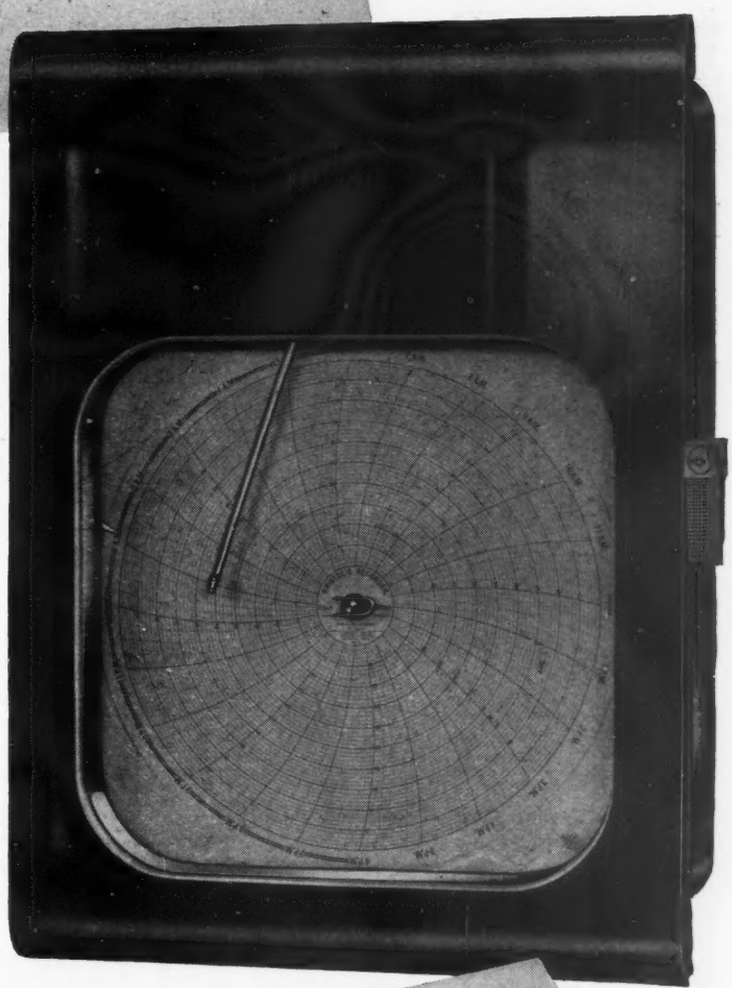
Heat Sealing Lumarith 21

UNCOATED Lumarith transparent film can now be heat sealed on some of the existing standard machines including the rotary, jaw and hand iron types according to the Celanese Corp., Dept. I, New York 16, N. Y. The tenting of bags can be accomplished on standard jaw type heat sealers with temperatures ranging from 400 to 500 deg., depending on the thickness and type of paper stock. This results in a weld of the paper to both surfaces of the Lumarith film as well as binding the acetate to itself.

Lumarith can also be heat sealed to

New!

THE BRISTOL "SERIES 500" RECORDING THERMOMETERS AND GAUGES



Newly Designed to Make Them:

- **Easier to Use**
- **More Convenient to Service**
- **Readily Convertible from One Type to Another**
- **Simple In Construction**

Bristol's new "Series 500" instruments bring new standards of accuracy, convenience and service performance to the field of recording thermometers and gauges. SERIES 500 RECORDING GAUGES ARE IN STOCK FOR IMMEDIATE DELIVERY.

Send For Bulletin

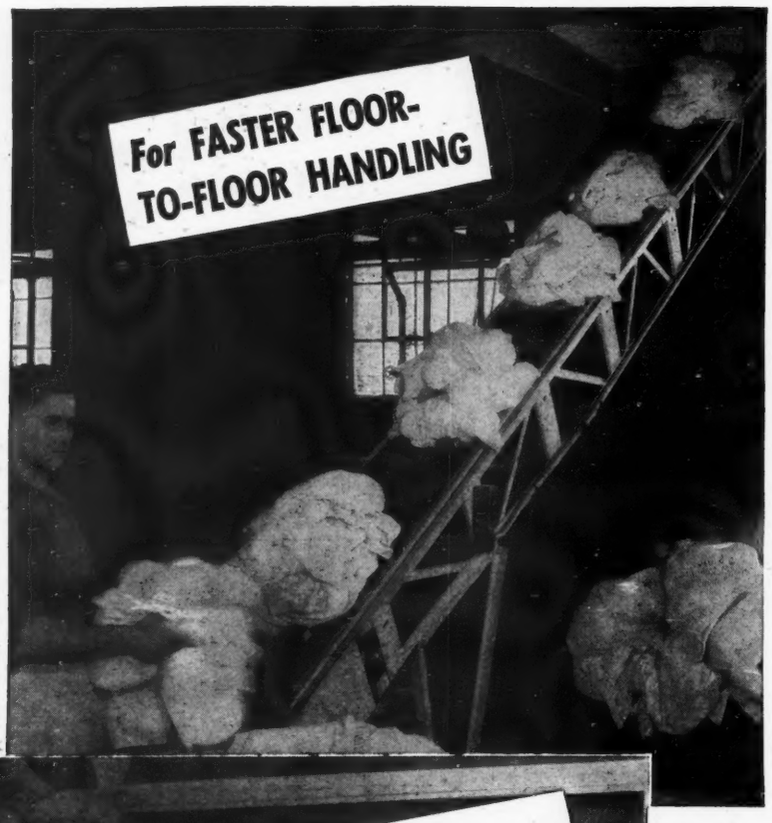
For the full facts on these new instruments, write for Bulletin T835. THE BRISTOL COMPANY, 115 Bristol Road, Waterbury 91, Conn. (The Bristol Co. of Canada, Ltd., Toronto, Ontario; Bristol's Instrument Co., Ltd., London N. W. 10, England.)

IMMEDIATE DELIVERY FROM STOCK!

Hundreds of indicating, recording and controlling instruments plus pyrometers, thermocouples and accessories can be shipped to you direct from our shelves . . . no waiting . . . no delay. Send for Bulletin W1811 Stock Instruments, and Bulletin P1235 Thermocouples and Pyrometer Accessories.

Engineers process control for better products and profits

AUTOMATIC CONTROLLING AND RECORDING INSTRUMENTS



FARQUHAR Conveyors Cut Your Costs

WHETHER it's bags, bales, boxes, bundles, cartons . . . whether you stack, pile, move, load or unload . . . Farquhar Freight Conveyors can cut your handling costs! Built to "take it," flexible Farquhar Conveyors make your packaged materials flow faster, more economically!

Top illustration shows how Farquhar freight model speeds up floor-to-floor handling in laundry plant — carrying laundry bundles from delivery trucks to second floor.

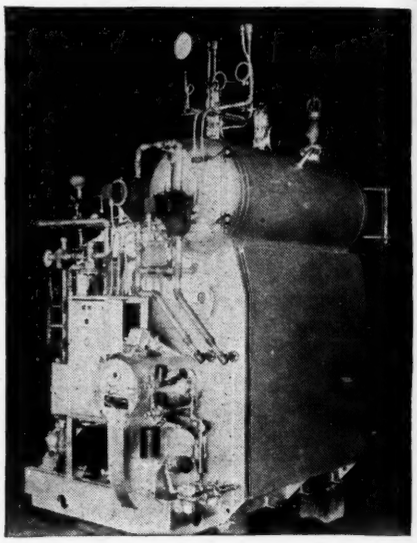
Bottom illustration shows how a North Carolina plant eliminated "dead" storage space with the installation of Farquhar Freight Conveyor. Hundred pound bags of cotton seed meal are now piled higher, faster, easier—in places never before possible with hand labor.

Farquhar has the right materials handling conveyor for your job, too! Tell us your handling problem; we'll give you the information you need. Write: A. B. Farquhar Company, *Conveyor Division*, 205 Duke St., York, Pa., or 628 W. Elm St., Chicago 10, Ill.

Farquhar
PORTABLE OR PERMANENT MATERIALS HANDLING
CONVEYORS

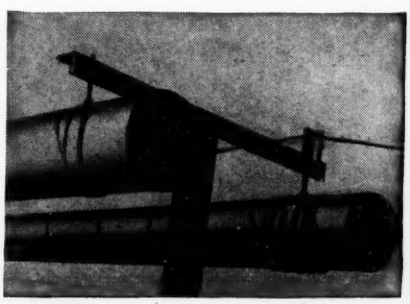
HYDRAULIC PRESSES FARM EQUIPMENT FOOD PROCESSING AND SPECIAL MACHINERY

itself with hand irons, jaw or rotary sealers which have been slightly altered. This can be accomplished by coating elements with tetrafluoro ethylene which eliminates the sticking of Lumarith to metal heat sealing elements. Nichrome wire is proving highly satisfactory as a heat source for sealing light and heavy gage Lumarith to itself.



Steam Generator 22

PACKAGE steam generators up to and including 27,000 lb. per hr., low pressure, up to 250 lb., and high pressure, up to 850 lb., are being produced by Foster Wheeler Corp., Dept. I, New York, N. Y. Designs provide for both oil and gas-firing, and a coal-fired unit will be ready shortly. Combustion controls provide full or semi-automatic operation, as desired, and are an integral part of the package. Operation from a central control panel is simple.



Insulated Pipe Units 23

COMPLETELY prefabricated pipe units for overhead distribution of oil, viscous fluids, process liquids and steam are made by the Ric-Wil Co., Dept. I, Cleveland O. The pipe in these units is insulated at the factory to meet individual project specifications. In their prefabrication, asbestos, cork or other insulation, as specified, is machine coated with high temperature asphalt and tension-wrapped with asphalt-saturated asbestos felt. A second coating of asphalt is followed by a tension-wrapping of aluminum or

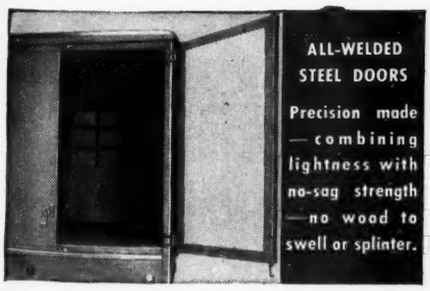
74 FACTORY BRANCHES DISTRIBUTE AND ASSEMBLE FRUEHAUF ALL-STEEL TRUCK BODIES!

OVER 500 COMBINATIONS—You'll find it easy to select the body best suited to your needs, with 4 basic models and hundreds of combinations to choose from, in the Fruehauf line. These are of durable, all-steel light-weight Aerovan-type construction, including doors. Each section is precision built to exacting tolerances for ease of assembly and replacement.

Sections are prime coated, ready for finish paint when the 10 simple assembly operations are completed.

SHIPPED KNOCKED DOWN—Bodies are shipped this economical way to keep costs at a minimum. You can assemble your truck body, or the work can be handled for you at any one of the 74 Fruehauf Factory Branches which stock these models.

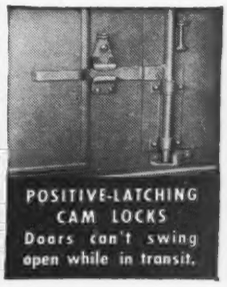
CUSTOM-BUILT QUALITY AT PRODUCTION-LINE PRICES!



ALL-WELDED STEEL DOORS
Precision made—combining lightness with no-sag strength—no wood to swell or splinter.

"HAT-SHAPED" FLOOR CHANNELS
Sturdy steel sections run length of body—welded to each crossmember—for rigidity.

HEAVY-DUTY HINGES
Pressed steel—doors swing back flat against body sides.

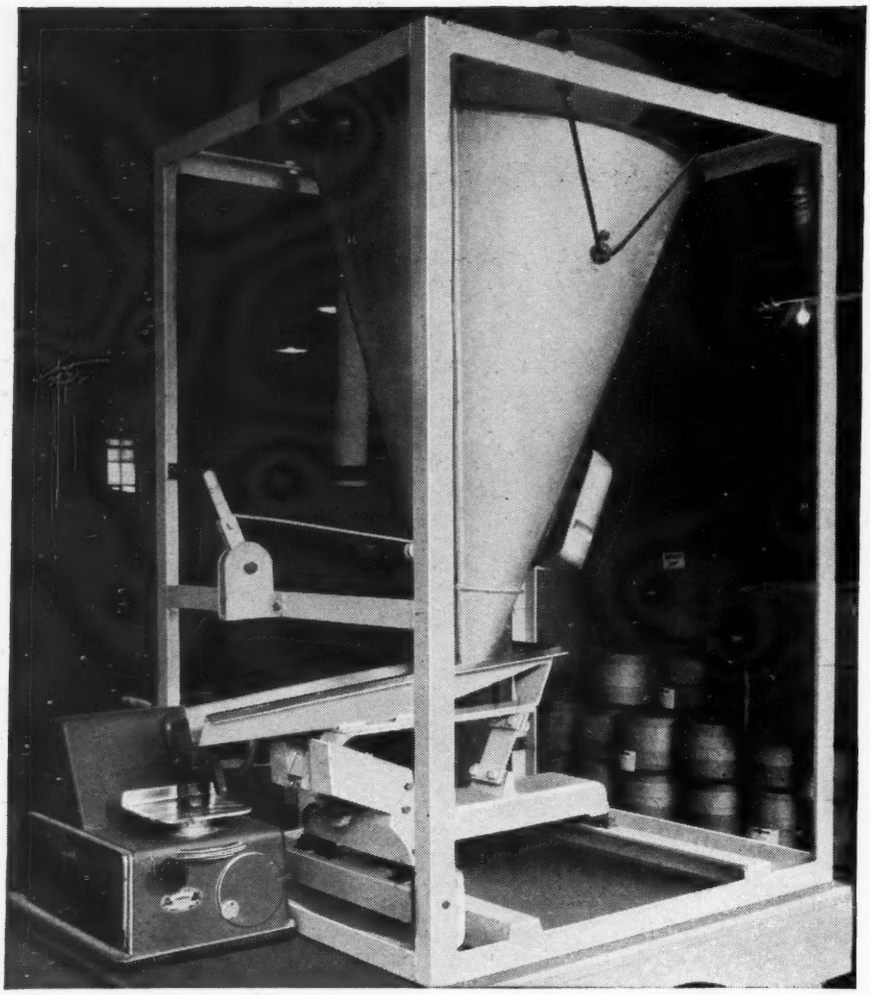


POSITIVE-LATCHING CAM LOCKS
Doors can't swing open while in transit.

BODY DIVISION **FRUEHAUF TRAILER COMPANY • DETROIT 32**

4 Basic Models ... Hundreds of Combinations!

FRUEHAUF TRUCK BODIES



Announcing the New EXACT WEIGHT Weighing Machine for Food Processors . . .

Batching - Packaging - Bagging - Feeding - Compounding

Features—

High speed with Accuracy. Elimination of human element.

Flexibility . . adaptable to wide range of food products.

Adjustable to variations in specific gravity or flow behavior of product.

Manpower . . . one operator can handle several machines.

Here is the new unit food processors have been asking for . . . a weighing and packaging machine for handling powders, flakes or crystals in fast, accurate volume production. Complete equipment comprises (1) EXACT WEIGHT Scale to specifications of the operation (2) "Vibra-Flow" feeder conveyor with two rate of flow rheostat control (3) Syntron hopper with pulsating magnetic electric vibrator and hopper support (4) EXACT WEIGHT electronic amplifying unit with automatic cut off for main and dribble feeds. With this equipment one single momentary contact push button control starts the fill. It's a new approach to greatly increased output, automatic accuracy and real labor cost savings. Write for complete specifications, available NOW!

See Full Display Packaging Exposition April 26—30th Cleveland

INDUSTRIAL PRECISION

Exact Weight Scales

THE EXACT WEIGHT SCALE COMPANY

21 W. Fifth Ave. COLUMBUS 12, OHIO

Dept. T, 783 YONGE ST. Toronto 5, Canada

copper foil which results in a highly efficient, durable unit completely waterproof and weather protected. A variant of the basic type unit employs a pipe supported within a pipe. In this way any desired temperature can be maintained within the pipes.

Soap Dispenser 24

POWDURN, a new dispenser for powder, beads or pumice soap that has no ratchets, gears or mechanical agitator, is made by American Dispenser Co., Inc., Dept. I, New York 3, N. Y. The entire container rocks back and forth shaking powder into the hand that operates the dispenser. Knob and discharge mechanism are of stainless steel, cover and container of brass, chromium plated.

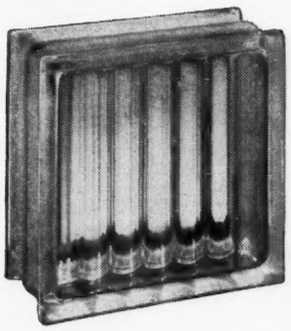
Swing Check Valve 25

A NEW type swing check valve with the body made in one piece and entirely without gaskets is announced by the Cooper Alloy Foundry Co., Dept. I, Hillside, N. J. An extra long hinge pin supporting the disk is supported on both ends by accurately machined plugs. Both disk arms and pins are free to rotate independently, thereby greatly reducing chances of either member freezing. The valves are made in various alloys, in sizes from ½ to 3 in. screwed, and ½ to 6 in. flanged.

Label Adhesive 26

A SYNTHETIC resin latex emulsion cement has been produced by Paisley Products, Inc., Dept. I, Chicago 11, Ill., which has the ability to make ungummed paper labels adhere permanently to a wide variety of surfaces and surface finishes. Designated No. 1707, it is offered for fastening instruction labels, circuit diagrams,

Why PC Glass Blocks are the mark of a modern building



• PC Glass Blocks are not only smart and modern in appearance—they are also extremely modern in functional versatility, in the many ways in which they help to improve industrial operating conditions.

Panels of PC Glass Blocks admit plenty of clear daylight without color change. The line includes patterns that serve all lighting functions, including directing daylight to areas where it is needed. The insulating value of PC Glass Blocks eases the load on air-conditioning equipment in summer, saves fuel costs in winter.

Easily cleaned and rarely needing repairs or maintenance, PC Glass Blocks also effect a sharp drop in maintenance costs. All of which adds up to important savings.

Whether you are considering new construction or remodeling projects, be sure you have the latest information on PC Glass Blocks. Send the coupon for our new booklet today. Pittsburgh Corning Corporation also makes PC Foamglas Insulation.

Architect, Hugh Nelson. Photo, Courtesy of Continental Rubber Works.

PITTSBURGH PC CORNING ®

GLASS BLOCKS

Distributed by PITTSBURGH PLATE GLASS COMPANY
by W. P. Fuller & Co. on the Pacific Coast and by Hobbs Glass Ltd. in Canada

FOR ADDITIONAL INFORMATION SEE OUR INSERTS IN SWEET'S CATALOGS.

Pittsburgh Corning Corporation
Room 626-8, 632 Duquesne Way
Pittsburgh 22, Pa.

Please send along my free copy of your booklet on the use of PC Glass Blocks in Industrial Buildings. It is understood that I incur no obligation.

Name_____

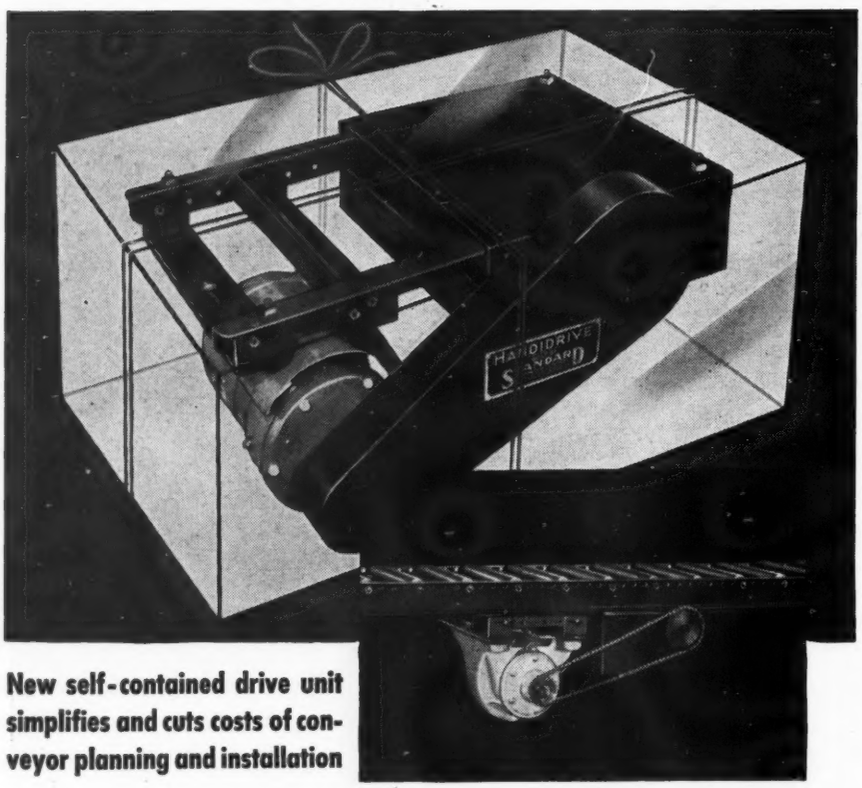
Address_____

City_____ State_____

Announcing the new Standard

HANDI-DRIVE

. . a "power package" unit for all types of roller and belt conveyors



New self-contained drive unit simplifies and cuts costs of conveyor planning and installation

Here it is! A packaged power unit that gives every conveyor user the opportunity to be his own layout engineer — to change his conveyor system to suit varying plant conditions in a minimum of time!

Converts gravity conveyors to live belt or roller conveyor quickly . . at low cost

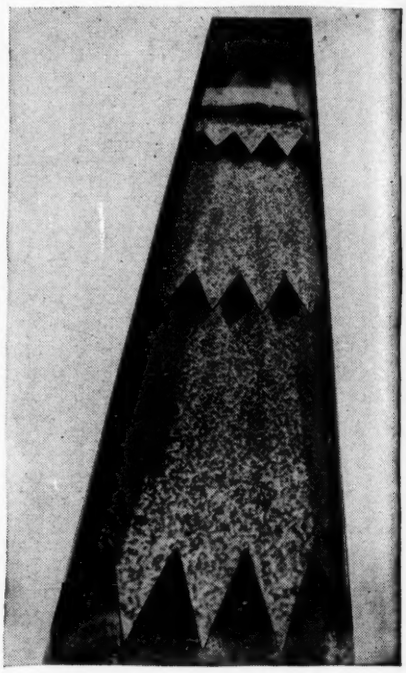
The Handi-Drive is a self-contained drive unit for applying tractive power to gravity conveyor belt or rollers. Equally important, using standard units you can build a conveyor system custom-planned to your individual plant needs. Standard units are stocked at the factory — you can get them now!

If you want to convert your present gravity conveyors to powered units — or if you want to install your own new system . . . send for the Handi-Drive Bulletin No. F I 48. It gives you complete design information and prices — tells you how to lay out your system, gives complete data on inclines, belt and roller widths, curves, weights to be handled and types of packaging or units to be moved. Write: Standard Conveyor Company, North St. Paul, Minnesota.

SEND FOR HANDI-DRIVE BULLETIN

Standard
GRAVITY & POWER
CONVEYORS

and caution and brand labels, to electrolytic tin plate, terne plate, varnished, lacquered, painted and enameled surfaces. It is also suitable for many combining and laminating operations on similar and dissimilar materials – such as cork to metal, felt to cardboard and paper to glass.



Vibrating Conveyor 27

A VIBRATING conveyor, designed with a series of stepped plates which produce a side slip that causes an intermingling or turning of particles as the material falls from one step to the next, is announced by The Jeffrey Mfg. Co., Dept. I, Columbus, Ohio. When used for mixing operations, two or more free-flowing materials are accurately fed to the conveyor for mixing while conveyed by vibration. The construction of the conveyor produces no degradation of materials—quality of product is maintained and no fines are produced. Because of the material turnover feature this equipment is especially desirable for conveying materials being treated with infrared or ultra-violet lights. It is also used in roasting or toasting processes using high temperature heat sources, and as an indirect type vibrating drier and cooler where steam or chilled water are used to heat or cool the conveying surface.

High Vacuum Rotary Still 28

A PILOT plant high vacuum still that permits fractional separation of liquids of high boiling point which are thermally altered at temperatures required for conventional distillation, is available from the National Research Corp., Dept. I, Cambridge 42, Mass.

The still contains a centrally cooled rotating cylinder as a condensing surface instead of the commonly used

Citric Acid
Tartaric Acid
Cream of Tartar

Chas. PFIZER & Co., Inc.

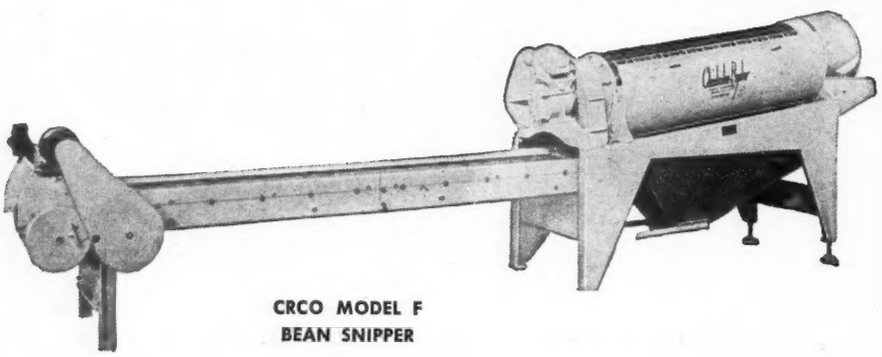
Manufacturing Chemists Since 1849

81 Maiden Lane, New York 7, N. Y.
444 W. Grand Ave., Chicago 10, Ill.
605 Third St., San Francisco 7, Cal.

6249

Better Snipping and Bean Grading

Means Better Appearing, High-Quality Product That Commands Premium Prices, Canned or Frozen



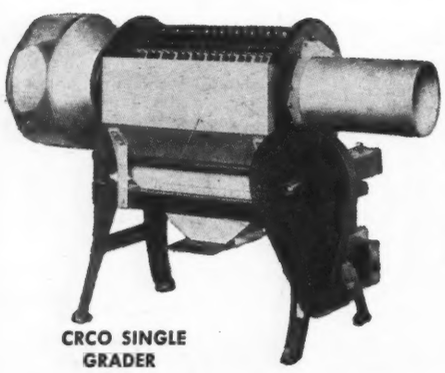
CRCO MODEL F
BEAN SNIPPER

The difference between standard and fancy stringless whole or cut beans—between normal and better profits—lies in the snipping and grading methods employed. With CRCO equipment, any packer can produce more-even, better-appearing packs than by any other method. Each machine in the line is designed for quality operation and maximum production.

MODEL F BEAN SNIPPER produces a clean draw-cut without pinching or unnecessary bleeding.

CRCO SINGLE GRADER accurately grades whole or cut beans according to diameter. Will deliver two distinct sizes.

CRCO DOUBLE GRADER is similar to the Single Grader excepting that it delivers three distinct sizes.



CRCO SINGLE
GRADER

One of the features of CRCO machines is that their design is such that bothersome clogs cannot occur—the product being caused to flow in an even, continuous stream which insures maximum efficiency.

Send for specifications and prices.

THE BEST OF Everything

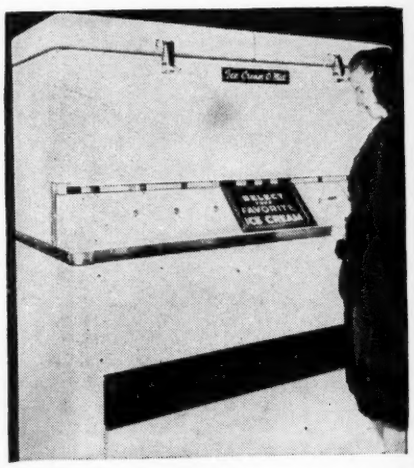
CHISHOLM-RYDER CO. INC.
Niagara Falls, New York
FOR THE FOOD PROCESSOR

Chisholm-Ryder Company of Pennsylvania
AN AFFILIATE

Ayars Machine Company
A SUBSIDIARY

(133)

packed column. Vapor rising from the still pot condenses on the cylinder and is thrown back to the surrounding evaporator by the centrifugal force of the rotating cylinder. The condensate is revaporized by a heated column and again condenses on the cylinder. This cycle is repeated many times as the vapor moves up the annular space between the column and the condenser, setting up a concentration gradient. The more volatile components are drawn off at the top of the still. Specifications of the unit: Pot capacity, 1 to 3 liters; size, 4 ft. x 5 ft. x 8 ft. high; power requirement, 12 kw., 220 v., 3 phase; cooling water, 5 gal. per min., at 70 deg. F.

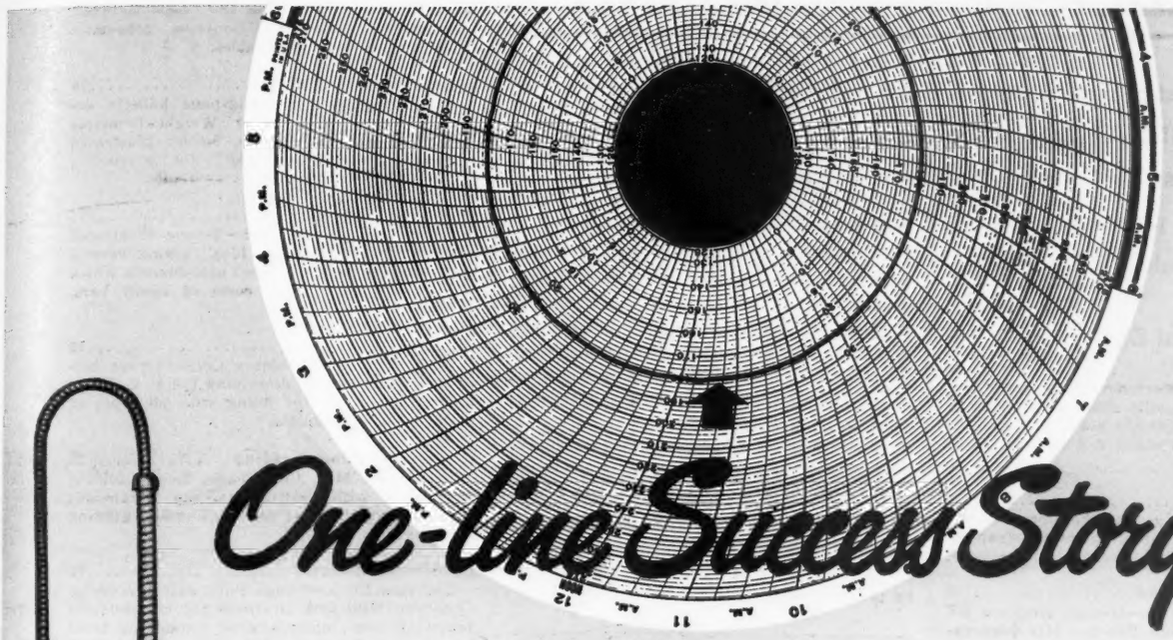


Ice Cream Dispenser 29

PRODUCTION of a new streamlined self-service dispenser, that delivers a package of ice cream at the press of a button, is announced by Frosted Food O'Mat, Inc., Dept. I, Oakland 11, Calif. The shopper scans a row of as many as six ice cream flavors, presses a button, and out drops a package. The unit eliminates the disadvantages of inadequate advertising display, and groping for packages in the cold lower sections of the storage cabinet. By placing items in a single row, the company made sure that the unit would not be obstructed by customers deciding on their purchases. Outstanding mechanical features include: an automatic defroster, below-zero temperature throughout the food compartment and first-package-in-first-package-sold, which means complete turnover of stock.

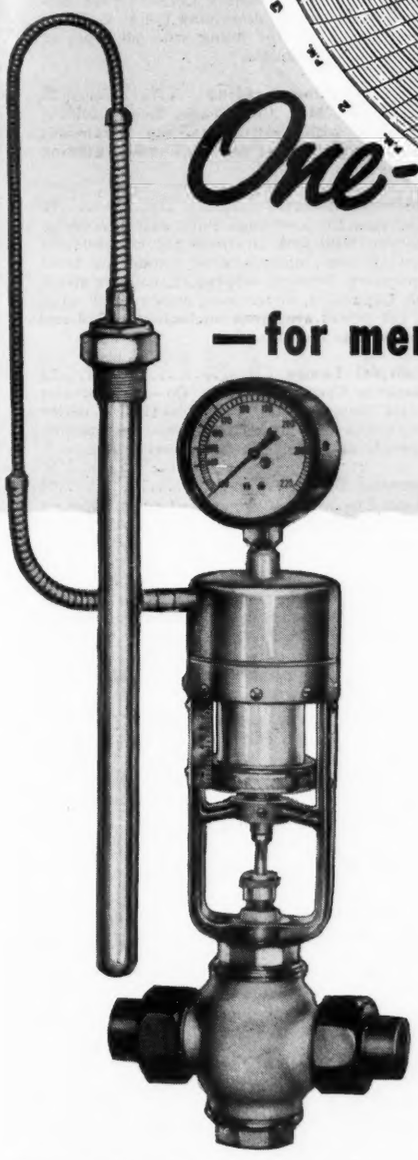
Rotary Pumps 30

A SERIES of rotary pumps offering positive displacement, high volumetric efficiency and low power requirements have been introduced by the Eclipse Corp., Dept. I, Chicago 18, Ill. Ordinary wear in use does not reduce the pump capacity or pressure, and quiet operation at standard electric motor speeds eliminates the need for belts and pulleys. The pumps will handle lubricating oils, hydraulic oils, kerosene, fuel oils and coolants. Capacities range from ½ to 4 gpm. at 125 psi. working pressure.



One-line Success Story

—for men who seek process improvements



There's a "success story" in the temperature chart shown above—of equal importance to processors as well as the men who make processing equipment.

To processors of food, chemicals, textiles or a host of other commodities, the uniform reading on the chart shows how Sylphon Temperature Regulators, attached to processing equipment, help maintain desired product-quality . . . help prevent spoilage . . . eliminate wasteful overheating.

To the equipment manufacturer, the chart shows how these regulators, as standard equipment, help insure the satisfactory performance of the machines you make.

Fulton Sylphon can help you be certain of a control that's *right* for the job. Specialists in this field for 44 years, we've developed accurate temperature regulators for practically all processing needs. No. 923-T shown at left is typical. Available with or without thermometer.

Rugged, compact, self-contained and self-powered, they are built for long, trouble-free service. Write today for Catalog GG-20 that gives complete details on the full line.

Temperature Controls • Bellows Devices • Bellows Assemblies

FULTON SYLPHON
DIVISION

FIRST WITH BELLOWS

ROBERTSHAW-FULTON CONTROLS CO., KNOXVILLE 4, TENN.

Canadian Representatives, Darling Brothers, Montreal

CATALOGS, BULLETINS

This digest of manufacturers' new publications is offered by FOOD INDUSTRIES Reader Service as a convenience for executives. The editors feature catalogs, data sheets and technical pamphlets likely to interest purchasing agents, superintendents, packaging men and food technologists.

Food Plant Equipment

Rotary Driers 51
Louisville Drying Machinery Co.—8-page bulletin No. 53, "Louisville Steam-Tube Rotary Dryers." Describes, with the aid of photographs and drawings, construction and installation of the driers.

Sirup Filler 52
International Filling Machine Corp.—4-page folder describing the latest automatic sirup fillers for gallon jug filling made by this company.

Beverage Filling System 53
Geo J. Meyer Mfg. Co.—48-page brochure, SY 126, on Meyer Dumore Syn-Cro Mix beverage filling system. Profusely illustrated with application photographs and diagrammatic views.

Bottling Equipment 54
The Liquid Carbonic Corp. — 16-page illustrated catalog describing Red Diamond Universal bottling plant equipment.

Chocolate Tank 55
Wegner Machinery Corp.—4-page folder describing the new Model A 150-gal. stainless steel chocolate melting and tempering kettle for the candy and baking industry.

Bottle Washers 56
Barry-Wehmiller Machinery Co. — 20-page catalog describing and illustrating National bottle cleaners for washing beverage bottles.

Milling Equipment 57
The Wolf Co.—new 12-page bulletin describing Wolf milling equipment. Construction features and general dimensions of the new Wolf compartment purifier, the LB "N" type Wolf sifter and streamline sifters, are illustrated and described.

Conveyor Elevator 58
Stephens-Adamson Mfg. Co.—8-page bulletin 344 describing the new "Zipper" enclosed-belt, continuous conveyor-elevator for handling bulk foods, coal or any granular, flaky, pulverized or small lump materials.

Platform Scale 59
Yale & Towne Mfg. Co.—16-page, 2-color bulletin P714C on its new Load King Dormant Platform Scale designed to eliminate excessive wear on the main pivots due to such causes as dropping heavy loads from overhead cranes and hoists, and from lateral movement of the scale platform caused by driving trucks onto the platform.

Collapsible Cargo Containers 60
Pittsburgh Steel Products Co.—8-page catalog illustrating and describing Pittsburgh 8-Way Steel Wire Collapsible Cargotainers for handling, shipping, storing.

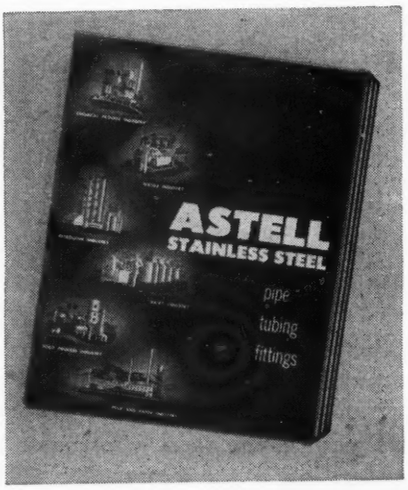
Stainless Tubing Book 61
Detailed engineering information on the selection, fabrication and use of stainless steel tubing and pipe is provided by a 92-page data book recently published by The Carpenter Steel Co.

Industrial Hose Lines 62
Aeroquip Corp.—28-page booklet on Aeroquip industrial hose lines and self-sealing couplings. Contains sectional views, line drawings, parts list.

Industrial Precipitator 63
Raytheon Mfg. Co.—8-page bulletin describing with illustrations and tables the Raytheon industrial precipitator with semi-automatic washer.

Steam Generator 64
Cleaver-Brooks Co. — 8-page bulletin 30-C-1 on the packaged steam generator built by this company. Illustrated with exploded views, line drawings, photographs and specification tables.

Heating Unit 65
Airtherm Mfg. Co.—4-page bulletin C-11 on the horizontal discharge, vertical discharge and blower type unit heaters; convection radiation; heating surface and direct fired heaters made by this company.



Stainless Steel Pipe 66
John B. Astell & Co.—8-page profusely illustrated brochure describing Astell stainless steel pipe, tubing and fittings.

Package Boiler 67
York-Shipley, Inc.—12-page, 2-color bulletin on "Steam-Pak Generator." Illustrated with photographs, exploded views, charts and capacity tables.

Beverage Water 68
Liquid Conditioning Corp.—12-page bulletin 9 on water-treating equipment for the beverage industry. Sketches showing the principles of operation of the equipment, with plan and elevation drawings and tables of capacities and dimensions of plants for clarifying and dealkalizing the water supply, are included.

Refrigerating Machines 69
Frick Co.—8-page, 2-color bulletin No. 100-D illustrating and describing the "New Eclipse" refrigerating machines. Contains schematic drawings and dimension tables.

Fruit Graders 70
Food Machinery Corp.—12-page bulletin describing the FMC Cutler Weight-Principle Fruit Grader. Also 6-page, 2-color illustrated foldout on the "Stericooler" for precooling fresh vegetables, root crops or fruits.

Wrapping Machinery 71
Package Machinery Co. — 2-page illustrated bulletin, "Money Saving Idea" giving several examples of newly developed attachments which are reducing wrapping costs of candy bars, cookies and crackers.

Rotary Filler 72
U. S. Bottlers Machinery Co. — 16-page bulletin illustrating and describing the U. S. Rotary Vacuum Filler for filling with all types of liquids and semi-liquids.

Produce Washing, Grading 73
Paramount Mfg. Co.—8-page, 2-color foldout describing, with illustrations, the Paramount potato, onion and produce washing and grading combinations.

Condensate Removal 74
Cochrane Corp.—8-page Publ. 4340 describing Cochrane Multiport Drainers for continuously removing large quantities of condensate from evaporators, heaters, separators, coils or steam lines. Capacities, dimensions, construction data, and list prices are given on both standard and external cage models.

Germicidal Lamps 75
Hanovia Chemical & Mfg. Co.—New booklet entitled "Danger in the Air" treats the two major applications for germicidal lamps: protection of people and protection of merchandise.

Automatic Boiler 76
Alert Engineering Products—4-page folder on Alert "Hot Steam" gas or oil boilers in sizes from 2-50 hp.

Vibrating Screens 77
Hewitt-Robins, Inc.—4-page bulletin No. 122-A, describing the Style M Vibrex screen and explaining the 2-bearing circle-throw principle employed. Applications and the full range of sizes in single or double deck styles are included.

Tube Cleaners 78
Thos. C. Wilson, Inc.—48-page, 3 color catalog No. 76 covering the complete Wilson line of tube cleaners for use in refineries, power plants, marine boiler rooms, locomotives and chemical process plants.

Materials Handling

Service Elevator 79
Fast, dependable inter-floor transportation with the Nordyke service elevator is described in a new 8-page bulletin by the Allis-Chalmers Mfg. Co. The elevator can be used in any building up to 200 ft. high. Its uses in flour and feed mills, paper plants, warehouses, filtration and power plants, lumber mills and garages are portrayed.

Electric Fork Truck 80
Crescent Truck Co.—6-page bulletin illustrat-

HOW TO GET THIS LITERATURE

Food Industries Reader Service now supplies tear-out coupon cards for your convenience in requesting copies of these new publications from manufacturers. Use one or more of the cards on the colored sheet bound near this page. Fill out, tear out, mail out and the Reader Service staff will see that your requests reach the manufacturers.

THE DEFT TOUCH OF

Ac'cent®

PURE VEGETABLE GLUTAMATE

works miracles in building reputation, popularity and sales of fine foods

Add a touch of *Ac'cent* to achieve that distinctive flavor, extra character, and satisfying taste which mark the difference between the ordinary and the superlative!

Famous gourmets, chefs and food technicians know mono sodium glutamate as an essential ingredient in intensifying the delicious flavors naturally present in fine food. *Ac'cent* is a wholesome protein food product, full strength because it is 99+% pure. It adds no flavor or color of its own and requires no change in basic formulae. Its only purpose is to enhance and retain the delicious flavors of food.

Now *Ac'cent* is freely available in 200-lb. drums for regular shipment. Try it! Our Technical Service Staff will supply samples and information on how to use the deft touch of *Ac'cent* in stepping up the taste appeal of your products.

99+% PURE MONO SODIUM GLUTAMATE

Amino Products

DIVISION

INTERNATIONAL MINERALS & CHEMICAL CORPORATION

General Offices: 20 North Wacker Drive, Chicago 6

Ampco Metal announces a line of corrosion-resistant centrifugal pumps...

Fills a real need — this new line of pumps is ideal for all industries faced with the problem of transferring corrosive and erosive thin liquids. Ampco Metal, Inc. manufactures these corrosion-resistant pumps, heretofore considered as special, on a production basis — giving you production-built prices and deliveries.

Ampco Metal makes the difference. The pumps are of the heavy-duty industrial type. They are soundly designed for mechanical durability, high efficiency, and ease of servicing. The paramount feature, however, is the material used in their construction; namely, *all aluminum bronze* as produced in Ampco Metal's laboratory-controlled foundry. These time-proven aluminum bronzes make possible the pumping of such liquids as sulphuric acid, acetic acid, mine water, brines, oils, solvents, beer, food process liquors, etc. Not only are the pump parts in immediate contact with the liquid made of aluminum bronze, but supporting members subject to seepage and spray, such as pedestal, shaft, and sleeve, also are made of this corrosion-resistant material.

Guaranteed efficiencies. These single stage, single suction, corrosion-resistant pumps use totally enclosed impellers. All liquid passages are streamlined for maximum efficiency, quiet operation, and minimum wear. Smooth sloping characteristics have sharp break-off to limit maximum horsepower requirements. All sizes of pumps are available either as pedestal-type for coupling connection to any type of drive, or close-coupled to a face-type motor.

Write for latest bulletin.

AMPCO TRADE MARK

P-23

Ampco Metal, Inc.

Department F. I. 4 • Milwaukee 4, Wisconsin

ing and describing the new Crescent electric Palletier Model MGVH in 3,000 and 4,000-lb. capacities. Includes charts of load lengths for each capacity, dimensional drawings and complete specifications.

Fork Truck 81
The Baker-Raulang Co.—Bulletin 1303 on the Baker 1,000 lb. fork truck. Contains illustrations, descriptions and specifications.

Control Equipment

Food Processing 82
The Brown Instrument Co.—First of a series of mailings intended to acquaint plant operators with the adaptability of Brown instruments and controls to food industry processes.

Instruments 83
Northern Equip. Co. — 10-page bulletin No. 477 illustrating and describing the Copes Pressure Reducing Valves. Cross-sectional diagrams illustrate different models.

Industrial Instruments 84
The Bristol Co.—24-page catalog No. W-1815 containing information this company's line of industrial instruments.

Control Valves 85
O. C. Keckley Co.—4-page catalog No. 48MC illustrating and describing the control valves, temperature and pressure regulators, and other equipment made by this company.

Proportioning Pumps 86
Milton Roy Co. — 2-page leaflet announcing this company's Constametric Pump for controlling greater flow without pulsation.

Defrost System 87
Tenney Engineering, Inc. — 4-page bulletin "TAD-48" showing a 2-color functional diagram of the new Tenney hot gas defrost system which indicates both the refrigeration and defrost cycles.

Plant Supplies

Rubber Goods 88
Manhattan Rubber Div., Raybestos-Manhattan, Inc.—Condensed catalog of mechanical rubber goods describing transmission and conveyor belting, V-belts, hose, engineered molded products, rubber roll coverings, tank linings and abrasive wheels.

Flavors 89
Norda Essential Oil & Chemical Co., Inc.—2-color brochure describing and listing their complete line of flavors for food processors.

Filter Aids 90
Johns-Manville—4-page folder on Celite filter aids on mineral fillers.

Adhesives 91
The Merchants Chemical Co.—Three 1-page releases on Dyna-Clad 1200, 1700 and 1800 adhesives.

Natural Emery Aggregate 92
Walter Maguire Co., Inc.—12-page bulletin, No. 701, on the most important element of good concrete—the aggregate. Gives the recommendations of the leading cement companies and the Portland Cement Association for good aggregate and shows comparative strength analyses.

Packing Green Vegetables 93
Link-Belt Co.—8-page book, No. 2073, illustrating and describing green-vegetable packing, handling and icing methods.

Production Control 94
Chronolog, Inc. — Bulletin EM-48-C on the Chronolog system of production control.

Bronze Electrodes 95
Ampco Metal, Inc.—24-page bulletin, W-17, contains factual information on how to weld a wide variety of alloys using bronze arc welding electrodes.

Bearing Catalog 96
The Federal Bearings Co., Inc.—260-page ball bearing catalog, "K," containing 100 pages of

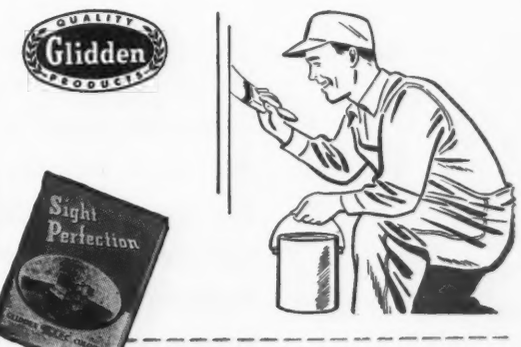
18 Years of Leadership!

America's foremost COLOR SERVICE

and America's Leading Maintenance Finish make painting...

Pay extra dividends!

For 18 years companies everywhere have been discovering how the combination of Glidden Color Service and Glidden SPRAY-DAY-LITE makes painting a *profitable investment,* instead of an expense. The scientific use of white and colors—so easy with free prescriptions tailor-made for your plant by Glidden experts—will stimulate production by improving visibility, safety and morale. And in just one coat Glidden SPRAY-DAY-LITE will give you a sanitary, easy-to-wash finish that will stand up so much longer than any you have had before! Send coupon below today for more facts on America's foremost Color Service and America's leading interior maintenance paint!



Glidden

Pacemaker in Paints

THE GLIDDEN COMPANY, Dept. MM-4
11001 Madison Ave., Cleveland 2, Ohio

☐ Please send literature to indicate the practical and thorough nature of the *Sight Perfection* painting program you will design especially for us.

☐ You may have your representative call and demonstrate SPRAY-DAY-LITE in our premises without obligation on our part.

NAME .....

COMPANY..... TITLE.....

ADDRESS.....

CITY, ZONE, STATE.....

SODIUM BENZOATE U. S. P.

Absolutely clean and of highest purity, fine-flaked Tepco Sodium Benzoate U.S.P. also gives uniformly BETTER SOLUBILITY.

●

Processing our sodium benzoate from coal from our own mines, through our own chemical plants, we are able to assure our customers a dependable supply at all times.

PROMPT SERVICE TO ANY PART OF THE U. S.

●

Tennessee Products & Chemical Corp.

General Offices: Nashville, Tennessee

Eastern Sales Office: 350 Fifth Avenue, New York 1, N. Y.

engineering information and data. Other sections describe and illustrate the many types of anti-friction and aircraft bearings produced by Federal and contains interchangeability and conversion tables.

Caulking Folder 97
L. Sonneborn Sons, Inc.—Illustrated 4-page combined color card and folder describing Kaukit, an elastic caulking and glazing compound.

Heating Jackets 98
Scientific Glass Apparatus Co., Inc—16-page bulletin, G-101, "Gyco Heating Jackets" for the laboratory.

Miscellaneous

Pipe and Stud Extractors 99
Reps Tool Co., Inc.—4-page descriptive folder covering its line of Reps pipe and stud extractors.

Welding Fittings 100
Taylor Forge & Pipe Works—Pocket size bulletin 476, "Stainless Steel Dimensional Data," describes welding fittings from 3 to 12 in., and lightweight American Standard flanges from 3 to 30 in. available in stainless steel, monel, inconel, nickel, copper and other industrial metals.

Tire Handbook 101
The B. F. Goodrich Co.—34-page Truck Operators' Handbook discussing the factors which can be controlled to get the most service out of any truck tire.

Hose Couplings 102
Hose Accessories Co.—20-page illustrated hose coupling handbook and service manual.

Laboratory Equipment 103
Schaar & Co. — 16-page catalog illustrating and describing laboratory equipment distributed by this company.

Chain Bulletin 104
Valley Foundry & Machine Works, Inc.—4-page bulletin containing valuable information on the use and construction of manganese bronze pintle and detachable chain. All types of Valley manganese bronze chain are described and illustrated in detail with drawings, photographs, specifications and price lists.

Insecticide 105
Whitmire Research Laboratories, Inc.—"Cold Blooded Killer," 10-page bulletin giving the history and properties of various insecticides which kill cold-blooded creatures but do not harm humans or animals.

Coin Vending Coolers 106
Ideal Dispenser Co., Inc.—6-page illustrated folder describing Ideal Selective Dispensers for beverages in either glass or paper.

Laboratory Mill 107
The Bauer Bros. Co.—Leaflet 5-3A describing and illustrating a new laboratory mill for grinding oil bearing seed and nut samples.

Insulated Panels 108
Air & Refrigeration Corp. — 8-page bulletin 30-F illustrating and describing their factory insulated panels that "save up to 90% in field labor on plenum chambers, air conditioning units and all kinds of rooms and enclosures."

Plant Management 109
Stonhard Co. — 48-page illustrated booklet, "Over the Rough Spots," tells how to eliminate ruts, holes and leaks in floors, walls, and roofs.

Water Conditioning 110
Liquid Conditioning Corp.—60-page bulletin, G-14, describing the most advanced and modern methods and apparatus for conditioning water and other liquids. Each of the many different types of water conditioning processes are described and the applications, advantages and limitations of each type are explained.

FOOD TECHNOLOGY
NEW DISCOVERIES AND INVENTIONS

DEHYDRATION

Processing Foodstuffs

DEHYDRATION followed by refrigeration and compression is proposed in a recent patent as a means of greatly reducing the bulk of all classes of foodstuffs and preparing them for market in compact form. The object of refrigeration is to solidify fats, oils and water-soluble vitamins, in the foodstuff so that they will not be expressed therefrom on compression into the smallest package consistent with satisfactory reconstitution for consumption. The dehydrated foodstuff is refrigerated to a temperature of 32 deg. F. to —45 deg. F., depending on the temperature at which the foodstuff and its constituents will remain non-fluid at the pressure to which it is thereafter subjected. This pressure will vary from 300 to 5000 psi. It has been found that there is a critical pressure for each foodstuff at which the product becomes a readily friable integrated unit that can be handled and packaged, but beyond which it is hardened and loses its normal structure. After compression the integrated unit is removed from the mold and, while still at low temperature, hermetically sealed in a waterproof wrapper.

Digest from U. S. Patent 2,433,348, issued Dec. 30, 1947, on an application dated May 18, 1943, to J. C. Donnelly, Greenwich, Conn.

Drying Extract-Solution

SPRAY-DRYING of water extracts of such substances as Irish moss is usually unsatisfactory on account of the low concentrations obtainable before the solutions become too viscous to be handled by normal plant equipment. These concentrations range from one to ten percent solids, in contrast to 40 percent solids in milk condensed for spray-drying. At these low concentrations the spray-dried extract is too light and fluffy and hygroscopic to be satisfactory. Two recent patents, however, disclose modified procedure which makes it practicable to use spray-drying for these water extracts. The crux of the process is to put only 90 percent of the solution through the spray drier, obtaining the usual fluffy product. This is then delivered to a dough mixer where it is mixed with the remaining 10 percent of the solution. The resulting dough mass is extruded through the small apertures of a feeding device, forming small particles that are carried by a continuous belt conveyor through a drying chamber, fed with warm or hot air. The product can be ground in a hammer mill to any desired size, and has satisfactory density and other properties.

Digest from U. S. Patents 2,431,622-3, issued November 25, 1947, on an application dated January 8, 1945, to A. E. Siehrs, Chicago, Ill., and assigned by mesne assignments to Krim-Ko Corp., Chicago, Ill.

DAIRY

HTST Pasteurization of Ice Cream Mix

TIME required for 99.99 percent destruction of a new test culture, *M. freudenreichii*, that apparently has the heat resistance formerly possessed by *E. coli* (no. 3 U), is 2-4 times greater for ice cream mix than for milk. The difference in time decreases with increased temperatures. This was established by experiments using an improved laboratory pasteurization technic that should give results similar to those obtained in commercial HTST pasteurization units. As a result of these tests the author concludes that pasteurization of ice cream mix at 180 deg. F. for 19 sec. is equivalent in reducing the total bacterial count to 160 deg. for 30 min.

Digest from "The Resistance of *Micrococcus Freudenreichii* In Laboratory High-Temperature-Short-Time Pasteurization of Milk and Ice Cream Mix," by M. L. Speck, *Journal of Dairy Science*, vol. 30, 975-81, December, 1947.

Hydrogenated Fat Ice Cream

ACCORDING to a recent patent the butter or milk-fat content of an ice cream mix can be decreased and the protein content increased without detracting from the full fat taste of ice cream. The fat content is decreased by hydrogenating butter oil from fresh sweet butter and using this with cream and other ingredients of ice cream. The protein content is increased by the addition, to the mixture of milk proteins, of other proteins such as purified soya or maize proteins. With this procedure it is possible to produce an ice cream containing only 10.5 percent fat, which will be as satisfying to the taste as one containing 14 percent fat. These mixes can be prepared in either liquid or dry form, to which appropriate quantities of milk are added before homogenizing and freezing.

Digest from U. S. Patent 2,433,276, issued Dec. 23, 1947, on an application dated Nov. 17, 1943, to Irene B. Hipple, Haverford and S. S. Sadtler, Whitemarsh, Pa.

CEREAL PRODUCTS

Popping Corn

KERNELS of popping corn, when examined under the microscope, have been found to differ from those of non-popping corn. Popping varieties have a circular cross-sectioned leucoderm, located at the center of the kernel near the apex. The pericarp is impermeable to water. When heat is applied, the moisture content of the kernel turns to steam, the starch grains are swelled and the kernel turns "inside out."

Non-popping varieties have non-

Index to Abstracts

DEHYDRATION
Processing Foodstuffs 199
Drying Extract-Solution 199

DAIRY
HTST Pasteurization of Ice Cream Mix 199
Hydrogenated Fat Ice Cream... 199

CEREAL PRODUCTS
Popping Corn 199

BAKING
Bleaching Flour 200

FATS AND OILS
Plastic Shortening 204
Alcohol Extraction of Vegetable Oils 204

SUGARS
Lactose Effect on Rats..... 206
Fruit-Flavored Raw Cane Sugars 206

QUALITY CONTROL
Arsenic Measurement 208
pH of Jams..... 208

MISCELLANEOUS
Milk Can Corrosion..... 210
New Lard Antioxidant..... 212
Flavoring Composition 212

STOP
THE OVERHEAD UNDERFOOT
DARNELL CASTERS
& E-Z ROLL WHEELS
Durable, precision-built Darnell Casters and Wheels assure the easy handling of heavy loads – savings in floor and equipment wear soon pay for their cost.
Write for Free 192 Page Darnell Manual describing nearly 4000 types of Casters and Wheels.
Always DEPENDABLE!
DARNELL CORP. LTD. LONG BEACH 4, CALIFORNIA
60 WALKER ST., NEW YORK 13, N.Y.
36 N. CLINTON, CHICAGO 6, ILL.

circular kernels, have no starchy gluten layer, and have a permeable pericarp. When the kernel is heated, the steam simply escapes without building any pressure. Some non-popping types of corn do not have a leucoderm in which steam can be generated.

Digest from "Notes on Maize" by A. Herzka, *Journal of the Society of Chemical Industry* vol. 66, 396-7, November 1947.

BAKING

Bleaching Flour

NITROGEN oxides formed by passing air through an electric arc in an Alsop generator have long been used for bleaching flour, but their use has decreased because they do not remove color as well as nitrogen trichloride and benzoyl peroxide, and because they do not yield the desirable baking properties obtainable with nitrogen trichloride and chlorine dioxide. It has been shown, however, that electric arc generators for producing nitrogen oxides can be converted to bleaching generators yielding chlorine dioxide, with resulting improvement in the bleaching process. The nitrogen oxides formed in the arc are passed upward through a vertical column of flaked sodium chlorite, with practically quantitative conversion of nitrogen oxides to chlorine dioxide. Comparative tests in bleaching flour with these two gases show marked improvement in slick score and crumb color when chlorine dioxide is used. Carotene content is also reduced, and the baking properties of certain types of flour are improved.

Digest from "Improved Flour Bleaching Process Using Chlorine Dioxide Produced by an Electric Arc Method," by W. S. Hutchinson and R. I. Derby. *Cereal Chemistry*, vol. 24, 372-76, September, 1947.

Ground Shell in Dry Egg

FINELY ground egg shell, added in the concentration of 0.4 percent, does not affect the palatability or cooking quality of dried egg in most food products.

In an attempt to increase the calcium content of dried egg, experiments were conducted on their flavor and cooking quality with and without the addition of small amounts of ground egg shell. Scrambled egg, baked custard, ice cream, foundation cake, muffins, yeast rolls, popovers and mayonnaise were prepared using dried egg fortified with calcium from ground egg shell. Samples made

(*Continued on page* 204)

Added appeal

. . a better way

to merchandise your food products

More than a year ago, food sales analysts predicted more competition ahead for all kinds of food products.

That prediction has come true.

Manufacturers are devising new ways to meet this increased competition.

What better way to merchandise your food product—to get housewives to reach for it—than to give it extra "nutrition appeal" and *advertise* that fact?

Many mothers today no longer buy *just* food. They want better nutrition—more nourishment for the well being of their families.

This buying attitude will undoubtedly become even more pronounced as more housewives learn the value of the words "enriched" or "fortified" on a food package.

Many food manufacturers have already fortified their candies, cereals, baby foods and other products.

If you are considering fortifying one or more of your food products, remember this: Standard Brands' experience in the food fortification field—and its products for vitamin B-complex, vitamin D and protein supplementation of foods—place this company in a position to render valuable assistance to you.

We will be glad to assist any manufacturer who may need help in fortifying food products. We invite you to discuss your needs in confidence with one of our technical representatives. Write to the address below.

Products containing
VITAMIN D

Fleischmann's Hy-Dee
Irradiated Dry Yeast

Fleischmann's Irradiated Dry Yeast
Type 700-H

Standard Brands Viosterol
(Irradiated Ergosterol)

Products containing
NATURAL B-COMPLEX FACTORS

Fleischmann's
Pure Primary Dry Yeasts *(brewer's type)*

Fleischmann's
Bee-Flex Products

Fleischmann's
Yeast Extract Types 3 and 41

Fleischmann's
Yeast Extract and Liver

STANDARD BRANDS INCORPORATED

Special Products Division • *595 Madison Avenue* • *New York 22, N. Y.*

LEWIS-SHEPARD

MULTIPLY MANPOWER · LEWIS-SHEPARD · TRADE MARK

MATERIALS HANDLING EQUIPMENT

"Sign of a Great Line"

TRADE MARK of the widest line of completely engineered wheeled Materials Handling Equipment you can buy. Backed by 33 years' concentration in this field, these job-tested Lewis-Shepard products include . . . Electric and Gas Power Fork Trucks • Steel Bound Pallets • "JackLift" Electric Trucks • Hydraulic and Mechanical Hand Operated Lift Trucks • Skid Platforms • Hand and Electric Power Stackers • Storage Racks • Hand and Electric Power Cranes • General and Specific Purpose Hand Trucks.

MR. . DOLLAR CONSCIOUS!
YOU SHOULD HAVE THIS CATALOG OF MATERIALS HANDLING EQUIPMENT THE KEY TO NEW PROFITS!

This 84-page book shows you how to apply our 33 years of experience to your business -- and make it pay off.
GET YOUR COPY TODAY!

LEWIS-SHEPARD
PRODUCTS INC.
144 WALNUT STREET WATERTOWN 72, MASS.
REPRESENTATIVES IN PRINCIPAL CITIES CONSULT YOUR PHONE DIRECTORY

with 0.4 percent ground egg shell were compared by sensory, physical and chemical criteria with those made without egg shell. Particles of shell coarser than 0.0015 in. resulted in grittiness in scrambled egg. It was not noticed in any of the other products, however, probably because of the presence of other ingredients and longer cooking times. Ground shell decreased the thickness of mayonnaise and increased the volume of popovers.

Digest from "Addition of Ground Egg Shell to Dried Egg for Use in Cooking," by E. H. Dawson, M. Duehring and V. E. Parks, *Food Research*, vol. 12, no. 4, 288-97, July-August, 1947

FATS and OILS

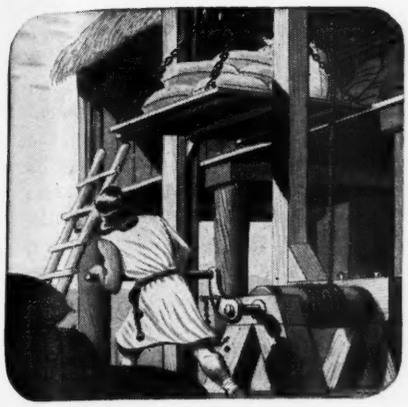
Plastic Shortening

EDIBLE shortening of the "compound" type, that has desirable consistency and hardness properties over an extremely wide range of temperature, is the subject of a recent patent. Typical of such a shortening is a blend of unhydrogenated vegetable oil with a small portion of the same oil that has been hardened by hydrogenation. In accordance with the present invention it is possible to produce a shortening that retains desirable plasticity over a temperature range of 35-120 deg. F. by using 20 percent cottonseed oil hydrogenated to an iodine value of 1.8, having a titer of 144 deg. F. While this shortening can be obtained with hydrogenated cottonseed oil, it cannot be produced with hydrogenated sesame or soybean oil. The invention is applicable, however, to either natural or artificially prepared hard fats containing palmitic and stearic acids within the desired range, for example beef fat.

Digest from U. S. Patent 2,430,596, issued November 11, 1947, on an application dated June 9, 1944, to N. W. Ziels, Leonia, and W. H. Schmidt, Grantwood, N. J., and assigned to Lever Brothers Co., Cambridge, Mass.

Alcohol Extraction Of Vegetable Oils

EXTRACTION of vegetable oils by means of alcohol has always been attractive because of the high temperature coefficient of solubility. But until recently it has been necessary, after oil separation, to distil the alcoholic solution for recovery of residual oil and byproducts. Elimination of this step now makes possible an alcohol extraction process more advantageous than the use of hexane. Elimination of the distillation step resulted from the

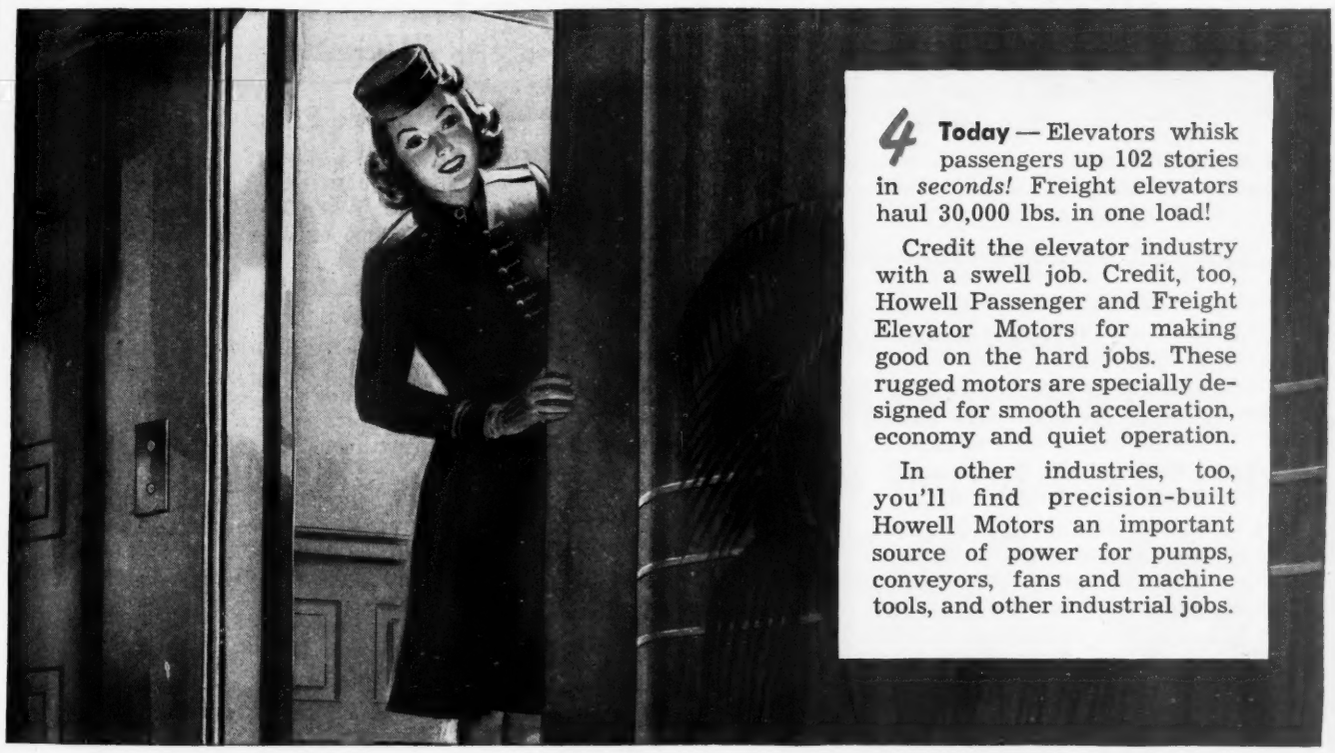


1 **300 B.C.**—Crude elevators like this helped primitive farmers store grain in bins above ground. Hand operation was the rule though animal power, even water wheels, were used.

2 **1850**—First elevator in America operated between two floors only. Use of elevators got the first big boost in 1890's with the advent of low-cost electricity and better safety devices.

3 **1915**—Howell "Red Band" Motors arrived. These rugged, industrial-type electric motors together with safer, stronger, faster elevators ushered in the new era of *skyscrapers.*

"GOING UP"—*and how!*

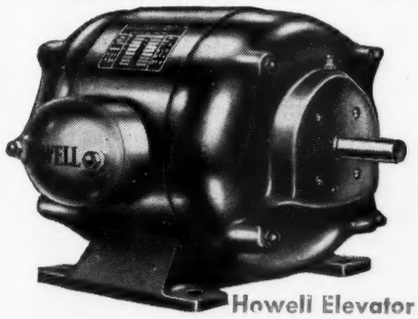


4 **Today** — Elevators whisk passengers up 102 stories in *seconds!* Freight elevators haul 30,000 lbs. in one load!

Credit the elevator industry with a swell job. Credit, too, Howell Passenger and Freight Elevator Motors for making good on the hard jobs. These rugged motors are specially designed for smooth acceleration, economy and quiet operation.

In other industries, too, you'll find precision-built Howell Motors an important source of power for pumps, conveyors, fans and machine tools, and other industrial jobs.

Here's another precision-built Howell Motor . . . industrial type with copper or bronze bar rotors . . . specially insulated . . . statically and dynamically balanced.



Howell Elevator Type Motors

HOWELL MOTORS

HOWELL ELECTRIC MOTORS CO., HOWELL, MICH.

Manufacturers of Quality Industrial Type Motors Since 1915

Minutes—Instead of Hours!
with
SYNTRON
CONSTRUCTION AND MAINTENANCE TOOLS

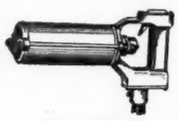
—busting concrete, digging clay, shale and frozen ground; cutting asphalt and tamping backfill—with Gasoline Hammer Paving Breakers.
—drilling, cutting, chipping and scaling concrete and masonry—with Electric Hammers.
—drilling, sanding, buffing and polishing wood and metal—with Electric Drills and Sanders.
—grinding welds, snagging castings and wire brush work—with Electric Grinders.

There are hundreds of "nuisance" jobs around your plant on which these Tools will save you time and money.

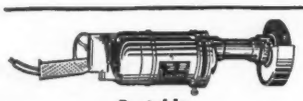
Write for illustrated folders.

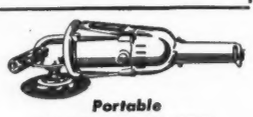
SYNTRON CO.
460 Lexington Homer City, Pa.

Gasoline Hammers
PAVING BREAKERS

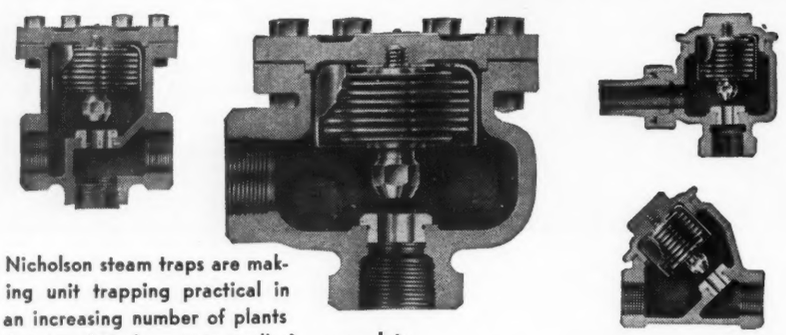

Portable
ELECTRIC HAMMERS

Portable
ELECTRIC DRILLS


Portable
ELECTRIC GRINDERS

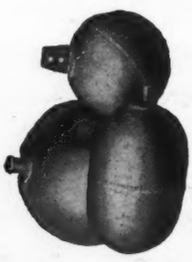

Portable
ELECTRIC SANDERS

Nicholson Makes
UNIT TRAPPING
PRACTICAL and ECONOMICAL



Nicholson steam traps are making unit trapping practical in an increasing number of plants due to: their low cost, small size, complete range of types, interchangeability of parts, no need to change or adjust valve or seat for any pressure. Other features: 2 to 6 times average drainage capacity; no freeze-ups, no air-binding; unequalled records for steam saving . . . BULLETIN 544 or see Sweet's.

5 TYPES FOR EVERY APPLICATION —process, power, heat. Size 1/4" to 2"; pressure to 225 lbs.



HIGH PRESSURE FLOATS in all sizes and shapes; welded; stainless, monel, steel. For operating mechanisms and as tanks or vessels. 2 - day delivery. Bulletin 746.

W. H. NICHOLSON & CO.
193 OREGON ST., WILKES-BARRE, PA.
Valves ★ Traps ★ Steam Specialties

discovery that, on cooling to 77 deg. F. or lower, non-oil solubles separate from the alcohol to an extent dependent on the temperature of cooling. Thus, when the alcoholic miscella is cooled to 32 deg. F. and the separated oil and non-oil solubles allowed to settle, the supernatant alcoholic solvent will come to equilibrium after repeated use at a total-solubles content of 4.3 percent. At 68 deg. F. the resulting total-solubles content is only 5.5 percent. This value has been established by reuse of the alcoholic solvent more than 85 times without distillation. An energy balance shows that this alcoholic process requires, theoretically, about seven-tenths as much energy as for the hexane process.

Digest from "The Nondistillation Alcohol Extraction Process for Soybean Oil," by A. C. Beckel, P. A. Belter and A. K. Smith, *The Journal of the American Oil Chemists' Society*, vol. 25, 10-11, January, 1948.

SUGARS

Lactose Effect on Rats

LACTOSE, when fed to rats in limited quantities, has no adverse effects. When the lactose content of the diet exceeds 25 percent, however, poor food utilization and diarrhea result.

In studies conducted with young growing rats, it was found that purified low-fat diets containing 5, 10 and 15 percent lactose had no adverse effect upon the rate of growth or food utilization, and did not cause diarrhea. When the lactose content was increased to 25-30 percent transitory diarrhea appeared; at 40-50 percent growth was affected, and at over 50 percent food utilization was less efficient, diarrhea was more severe and persistent. Rats whose lactose ration was gradually increased to 50 percent suffered less than those suddenly placed on that diet.

Digest from "Some Unique Properties of Lactose as a Dietary Carbohydrate," by D. K. Riggs and A. Beaty, *Journal of Dairy Science*, vol. 30, 939-50, December, 1947.

Fruit-Flavored Raw Cane Sugars

CHANGING the objectionable taste of unrefined raw cane sugar to a palatable fruity taste can be accomplished by methods disclosed in a recent patent. According to the specifications, raw unrefined sugar obtained by crystallization from defecated cane juice is redissolved in water to yield a solution of about

Long ago ...buying valves was simply a question of "how many?"

Long ago, when valve making was in its infancy, all valves were pretty much alike. So no one worried about what *kind* of valves to buy. But because industrial flow control requirements were equally simple, almost everyone was fairly well satisfied.

But not everyone! Because Powell, not content to "let well enough alone," introduced the first regrinding globe valve in 1865 ... and ever since then Powell has been producing "firsts."

And so today, to satisfy the many diverse and complex flow control requirements of modern industry, Powell makes a Complete Line of valves—not only in Bronze, Iron, and Steel, but also in the widest range of corrosion-resistant metals and alloys ever used in making valves.

As a result, there's still no need to worry about what kind of valves to buy—merely consult Powell Engineering.

The Wm. Powell Co., Cincinnati 22, Ohio

DISTRIBUTORS AND STOCKS IN ALL PRINCIPAL CITIES

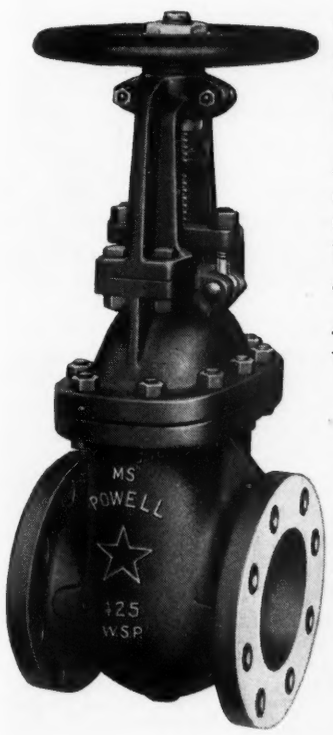


Fig. 1893—125-pound flanged end Gate Valve with bolted flanged yoke, outside screw rising stem and taper wedge solid disc. 3% Nickel Iron body, bonnet and yoke with alloy trim parts.

Fig. 375—200-pound Bronze Gate Valve with screwed ends, inside screw rising stem, union bonnet and renewable, wear-resisting "Powellium" nickel-bronze disc.

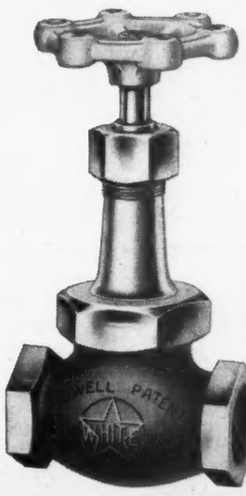


Fig. 1708—200-pound Bronze Globe Valve with screwed ends, union bonnet, renewable, specially heat treated stainless steel seat and regrindable, renewable, wear-resisting "Powellium" nickel-bronze disc.

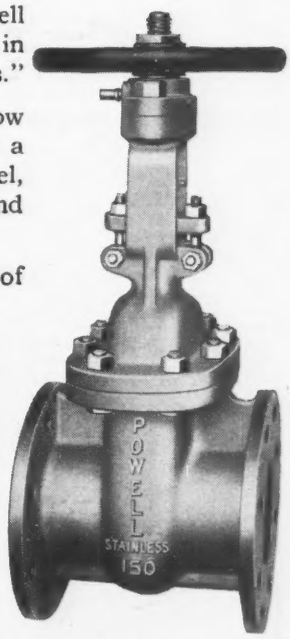


Fig. 2453-G—New, standard 150-pound Stainless Steel Gate Valve with outside screw rising stem, bolted flanged yoke-bonnet and taper wedge solid disc.

POWELL VALVES

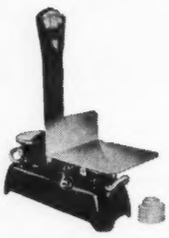
DETECTO SCALES

There's a precision-accurate Detecto Scale for your specific weighing and counting need. The Detecto helps increase production, yet assures you maximum accuracy by making slightest weight discrepancies immediately visible.

DETECTO-GRAM NEW PACKING SCALE

Another Detecto-Gram Scale for weighing your ingredients accurately. New Model #8800 brings to your heavy duty weighing jobs the mechanical accuracy previously found only in small scales. Capacity ¼ ounce to 60 lbs.

Write for Catalogue



DETECTO · SCALES · INC.

MAKERS OF FINE SCALES SINCE 1900

1004 MAIN STREET • BROOKLYN 1, N. Y.

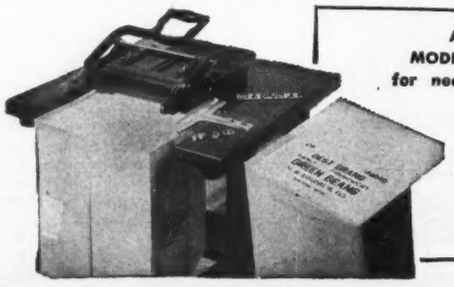
SCALE ENGINEERS IN ALL PRINCIPAL CITIES

Reduce Inventory of PRE-PRINTED CASES

IMPRINT CONTAINERS AS YOU NEED THEM with INDUSTRIAL PRINTER

Why tie up space with large stocks of corrugated cases and other containers pre-printed for each brand, grade, product you pack? With an INDUSTRIAL PRINTER you keep minimum inventory of **blank** or **semi-printed** containers—imprint variable or supplementary legends on the quantity actually required at any time.

Inexpensive, high-speed, easy-to-operate machine. Imprints from interchangeable rubber type.



Automatic or Manual
MODELS IN VARIOUS SIZES
for neat, efficient imprinting of:

CORRUGATED CASES
TAGS, CARDS, TICKETS
KEG and BARREL TOPS
BAGS—FLAT CARTONS
SET-UP BOXES
ROUND CANS, DRUMS
PLASTIC, METAL PRODUCTS

Request Data Sheet describing all INDUSTRIAL PRINTER models.

MARK O MATIC

ADOLPH GOTTSCHO, INC.

MACHINES TO MARK WHATEVER YOU MAKE

191 Duane Street, New York 13, N. Y.

40 Brix. It is acidified to a pH of 4.5-5.5 and heated at superatmospheric pressure to 255-290 deg. F. for a period of time insufficient to cause substantial inversion. The solution is then filtered and further acidified to a pH of 2.5-3.6, whereupon the objectionable tasting complexes are changed into desirable fruity aromas and flavors. This product can be concentrated to form a jelly with added pectin. The type of flavor can be controlled by the ash content of the raw cane sugar. An ash content of 0.5 percent will produce an apple or apricot flavor; at 0.75 to 1.0 percent, a guava or plum flavor; and at 1.0 to 1.5 percent, a true prune flavor.

Digest from U. S. Patent 2,430,903, issued November 18, 1947, on an application dated August 12, 1943, to A. M. Zenzes, New York, N. Y.

QUALITY CONTROL

Arsenic Measurement

NEW photoelectric cell technic for detecting and measuring traces of arsenic in foods, drugs, alloys, and other materials was described at the symposium of the American Chemical Society. The new technic is applicable to small samples and gives accurate results in routine analysis.

Two chemical steps free the arsenic from the sample. Treatment with hypophosphorous and hydrochloric acids liberates the arsenic in the form of a pure metallic powder. This powder is then redissolved and combined with molybdenum, uniting with it to form, a compound of deep blue color. Measurement of the intensity of the blue color with a photoelectric colorimeter indicates the amount of arsenic present.

Digest from talk by O. P. Case of American Brass Co., Waterbury, Conn., at 3rd Annual Pittsburgh Analytical Symposium, A.C.S. February 13, 1948.

pH of Jams

JAMS and jellies require a pH within reasonably narrow limits for optimum set, and adjustment of the fruit-sugar pectin mixture may be necessary to achieve this. Measurements are best made on a 50 percent solution of jam in water since dilution does not markedly affect the pH and results are likely to be more consistent. Sugar concentration affects pH readings especially if a glass electrode is used (the quinhydrone electrode is not affected). Separation of pectin changes the pH slightly. Both ef-

There's GOOD NEWS tonight

. . . and every night, for the fellow who has Wellworth pickles on hand.

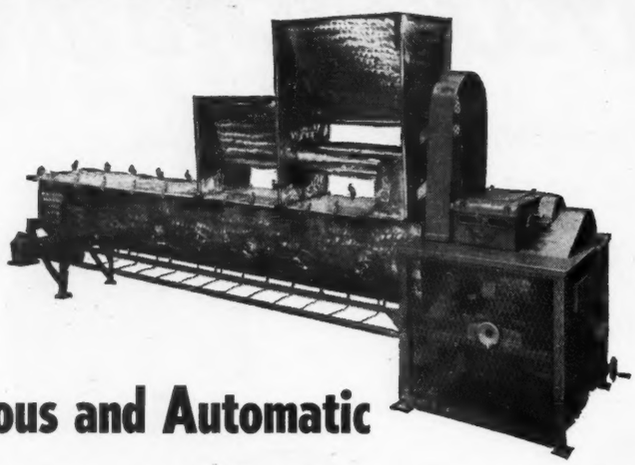
They add just the right touch to that bedtime snack.

Like so many other prominent packers, the Wellworth Pickle Works of Paterson, N. J., likewise find Crown Closures "good news." Crown methods of precision manufacture give these closures a uniformity that means trouble-free application on production lines and uniformly dependable sealing. There's satisfaction too, in knowing that Crown furnishes a wide variety of liners to meet the individual sealing requirements of any product . . . and of course, the famous Deep Hook Thread, available only on Crown Closures, gives the extra sealing pressure that assures complete dependability. Crown Cork & Seal Co., Baltimore 3, Md. *World's Largest Makers of Metal Closures.*

CROWN CLOSURES

Approved by millions of housewives

ALLAN COOKER OPERATION--



Continuous and Automatic

ALLAN Cooker design stands out because of its continuous and automatic operation features. A single operator can tend two or more ALLAN Cookers with no more effort than he uses in operating one conventional type cooker. Yet cooking costs are lowered . . . high product quality maintained . . . production more efficiently controlled.

Allan Iron & Welding Works, Inc., 137 Murray Street, Rochester 6, New York

Ask for Bulletin A-1

ALLAN
CANNING MACHINERY

Whether used in freezing, canning or dehydrating . . . on sorting tables, in scalders, washers or cookers . . . for bulk or packaged goods . . . La Porte Flexible Steel Conveyor Belting gives efficient, worry-free service. Its non-corrosive metal is not effected by steam, water or extreme temperatures. Its strong, flexible construction will not stretch out of shape . . . slip . . . weave . . . or jump. It is easily and quickly cleaned and sterilized with steam or hot water, and no special dressings or belt lacers are needed to keep it in peak condition.

Ask your Supplier Today. Available in any length and practically any width.

LA PORTE MAT & MFG. CO.
BOX 124 LA PORTE, INDIANA

fects are made less by measurement on diluted jam.

From measurement on 50 percent extracts of fruits, jams, and pH adjusting acids and salts, equations for pH adjustment of a jam formula have been derived. To simplify the calculations for citric acid or sodium bicarbonate required to adjust a particular jam, a circular slide-rule can be prepared. Five factors are required: The free acidity of the jam; pH of the untreated jam; kind of jam; pH desired in the finished batch and amount of pH lowering.

The neutralization curves obtained for different fruits check fairly well with those predictable for their known acid constituents, modified by their calcium and pectin contents. A few differ, however, suggesting that these fruits contain acids as yet undetermined. Green gage plums and blackberries appear to contain an acid not citric, malic or tartaric. Isocitric acid has been found in blackberries by Nelson.

Digest from "The Control of the pH of Jams," C. L. Hinton, *Journal of the Society of Chemical Industry*, vol. 66, 381-86, November 1947.

MISCELLANEOUS

Milk Can Corrosion

LABORATORY corrosion tests on 10 sq. in. strips of hot-dipped tin plate have yielded significant data on the corrosion of milk cans by commercial can washing compounds. Total and partial immersion tests were made with various concentrations of 8 alkaline and 2 acid commercial cleaners, and with 4 basic alkalies, all in distilled water to avoid deposition of salts. Time of exposure was 73 min., representing an assumed exposure of a can in the standard can washer of 12 sec. daily for one year. Temperature was 160 deg. F., the highest recommended for any of the commercial cleaners. The influence of oxygen was investigated in various concentrations of sodium hydroxide only.

All of the commercial alkaline cleaners and the basic alkalies readily attacked tin, and the corrosion rates were within the so-called "serious" range of near or above 100 mg. per sq. dm. per day. The acid cleaners did not appreciably attack tin during time of exposure. In the tests with sodium hydroxide it was shown that concentration, except in the lowest range, had little effect on corrosion, but that

Don't be surprised by this shopper—

She's a thrifty lass—today's shopper. Her mind is on her food budget, and her eyes are alert for the best values.

Smart merchandisers know that Cellophane packaging is an important help in selling this value-searcher. It *shows* her what she wants to know about size, color, quality, etc. It tells her, too, that freshness and cleanliness are properly safeguarded — because Cellophane *protects* what it *shows*.

E. I. du Pont de Nemours & Co. (Inc.), Cellophane Division, Wilmington 98, Delaware.

DuPont Cellophane

Shows what it Protects —at Low Cost

DU PONT
REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

Freshness MAINTAINED
UNDER ALL CONDITIONS WITH
Steri Seald
LINED STEEL
CONTAINERS
Berries, preserves, fruits, jellies, syrups and foods of all kinds packed for shipment or storage maintain their original freshness and purity in Steri Seald Lined Steel Containers. Frozen foods freeze faster and thaw faster and have the complete protection against contamination or leakage that only a steel container can give. Steri Seald lined drums and pails represent the highest achievement in bulk packaging of foods.
INLAND STEEL CONTAINER CO.
Container Specialists

the oxygen content was the primary factor. The conclusion is reached that a corrosion inhibitor, such as sodium sulphite, should be incorporated in alkaline can washing compounds, not only to minimize corrosion but to permit use of the more germicidal alkalies in the cleaning compounds.

Digest from "A Study of the Corrosion of Tin Plate by Can Washing Compounds," by Roy D. Finley and Milton J. Foter, *Journal of Milk and Food Technology*, vol. 10, no. 5, 263-268, September-October, 1947.

Flavoring Composition

VANILLIN solutions are usually made with alcohol because the material is not sufficiently soluble in water to produce a flavoring extract of desired strength. According to a recent patent, however, an aqueous non-alcoholic vanillin flavoring extract can be made that will contain 10-15 g. per l. of vanillin and up to 2 g. per l. of coumarin. Vanillin and coumarin are first dissolved in a buffer salt solution, such as sodium phosphate, citrate or tartrate, and water is added to the desired volume. The pH of the solution is adjusted by addition of sodium hydroxide or citric acid to range from 5-7. Such a solution is stable and does not contain undesirable amounts of sodium vanillin. The buffer salts inhibit the crystallization of the vanillin.

Digest from U. S. Patent 2,429,907, issued October 28, 1947, on an application dated January 25, 1945, to F. J. Zimmermann and M. Kayner, Wausau, Wis., and assigned to Salvo Chemical Corp., Rothschild, Wis.

New Lard Antioxidant

THREE tocopherols — alpha, beta and gamma — have been known for some time for their antioxidative properties and have been shown to be effective antioxidants in lard. Gamma tocopherol has been more effective than beta, which in turn has been more effective than alpha. Recently another tocopherol—delta—has been isolated and tested for its antioxidant effect in lard. Comparative tests were made with all four tocopherols by means of a modified Swift stability test at 212 deg. F. at concentrations of 0.02 and 0.1 percent tocopherol. Delta-tocopherol proved most effective as an antioxidant. The ratios of relative activities at 0.02 percent concentration were 1:1.2:1.3:1.5 for alpha, beta, gamma, and delta, respectively. At 0.1 percent concentration the respective ratios were 1:1.3:2:2.5.

Digest from "Delta-Tocopherol as an Antioxidant in Lard," by J. Griewahn and B. F. Daubert, *The Journal of the American Oil Chemists' Society*, vol. 25, 26-27, January, 1948.

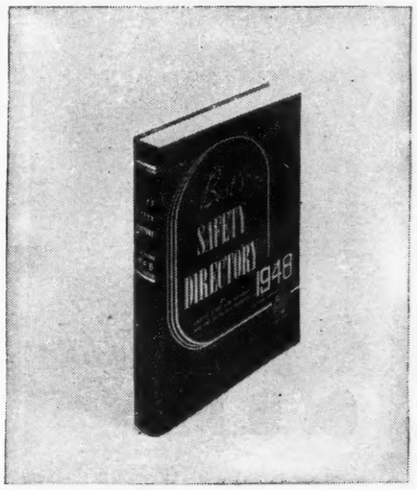
BOOKS

Safer Plants

BEST'S SAFETY DIRECTORY. Published by Alfred M. Best Co., 75 Fulton St., New York 7, N. Y., 1948. 494 pages; 11¼x8¼ in.; cloth. Price $5.

Here is a directory that should prove useful to the food plant executive as well as to department supervisors. It covers practically every phase of safety operation, including such aspects as plant maintenance, plant and personal hygiene and, of course, accident prevention.

The book lists equipment controls and guards, and devices for handling liquid and solid materials. The manufacturers of the various items are conveniently listed, for the most part, on the page on which the description appears.



Milk Laws

LEGAL ASPECTS OF MILK SANITATION, Second Edition. By James A. Tobey. Published by Milk Industry Foundation, Chrysler Bldg., New York 17, N. Y., 1947. 133 pages; 9¼x6¼ in.; cloth. Price, $5.

From the legal aspect a great deal has occurred in the milk industry since publication of the first edition of this book, in 1936. For instance, about 100 important decisions, affecting milk sanitation, have been handed down by higher courts, during that period. These decisions are either abstracted or listed in this new edition.

As in its original appearance, the book attempts to set forth the constitutional, administrative, public and private law as it is applied to the production, handling, processing, distribution and sale of milk and dairy products.

While both editions have the same author, the International Association of Milk Dealers, publishers of the first edition, are succeeded by the Milk Industry Foundation in this revised and extended edition.

New Series

THE ESSENTIAL OILS. By Ernest Guenther. Published by D. Van Nostrand Co., Inc., 250 Fourth Ave., New York 3, N. Y., 1948. 427 pages; 9¼x6¼ in.; cloth. Price, $6.

A broad reference work on essential oils is inaugurated with the appearance of this volume. It treats of the history, chemistry, biological origin and function of these oils in plant life. Synthetics and isolates are also examined.

This first volume includes production of essential oils and deals with processes in use throughout the world. An attempt is made to stress the procedures that make for the greatest efficiency.

Asidc from the author's own contribution, chapters have been prepared by A. J. Haagen-Smit, Edward E. Langenau and George Urdang.

Succeeding volumes will describe the chemical constituents of essential oils and will offer detailed descriptions of individual oils. It is expected that the completed work will constitute the most practical and authoritative work ever published on essential oils.

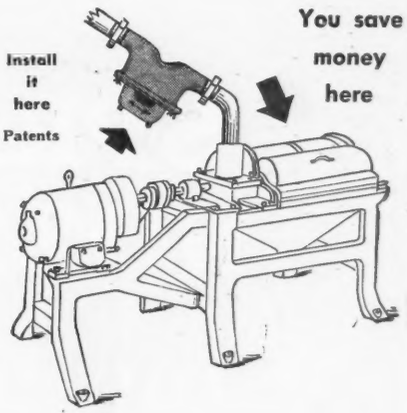
Food Values

PROTEINS AND AMINO ACIDS IN NUTRITION. Edited by Melville Sahyun. Published by Reinhold Publishing Corp., 330 W. 42nd St., New York 18, N. Y. 1948. 566 pages; 9¼x6¼ in.; cloth. Price, $7.50

With our growing recognition of the importance of adequate food supplies throughout the world, the economic value of finding low cost foods of highest nutritional value becomes more and more apparent. While this volume is not a treatise on the economic feeding of great numbers of persons, its appearance at this time lends special interest to its contents.

As its title suggests, the book points out the role of proteins in nutrition along with the consequences of protein and amino acid deficiencies. In recognition of the other basic components of the human diet, consideration is also

CUT SCREEN COSTS



Eliminate Damage

Pulper and Finisher Screens are protected from iron nuts, bolts, trimming knives and other tramp iron in your canning line.

CESCO Sanitary MAGNETIC TRAPS

not only save money by eliminating screen damage . . . they also save valuable production time lost through shut-down for repairs.

Non-electric . . . easy to install . . . they pay for themselves many times over.

Be wise and install "CESCO" MAGNETIC TRAPS in your cannery for the coming season.

Write for illustrated folder or see your nearest Canning Machinery Distributor.

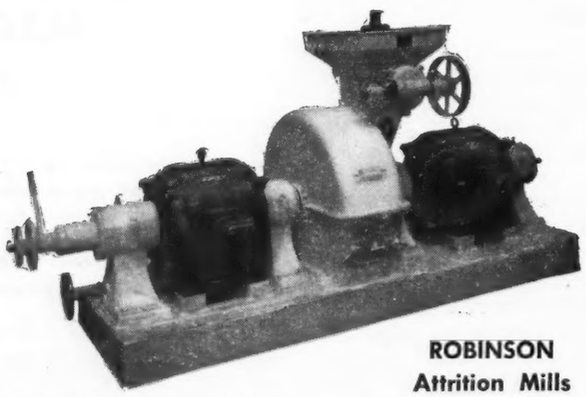
Manufactured by

COLUMBIA ENGINEERING SERVICE CO.

593 Market Street, San Francisco 5, Calif.

ROBINSON
PROCESSING UNIQUE EQUIPMENT

Fine, Finer, Finest . . . Coarse, Coarser, Coarsest!



ROBINSON
Attrition Mills

Attrition Mills for grinding all types of material. Adjustable for coarse or fine grinds. Hard iron grinding plates. Capacities to your requirements. Robinson Processing Equipment is designed by engineers whose reputation is founded upon doing things right. Literature available. Inquiries invited.

ROBINSON MANUFACTURING CO.
Plant: Muncy, Pa.
SALES REPRESENTATIVE
MERCER-ROBINSON COMPANY, INC.
30 CHURCH ST., NEW YORK 7, N. Y.

given to the intimate nutritional relationships that proteins bear to carbohydrates, fats, vitamins and mineral salts.

GOVERNMENT PUBLICATIONS

The following recently issued documents are available, at the prices indicated, from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. When no price is indicated the pamphlet is free and should be ordered from the Bureau responsible for its issue.

BUTTER AS A SOURCE OF VITAMIN A IN THE DIET OF THE PEOPLE OF THE UNITED STATES. Department of Agriculture. Miscellaneous Publication No. 636. Price 15 cents. A statistical economic interpretation with recommendations as to dietetic significance.

DIRECTIONS FOR MAKING KEFIR FERMENTED MILKS. By L. A. Burkey. Bureau of Dairy Industry, BDIM-Inf-58. Processed. A brief outline of operating methods suggested by the bureau.

CITRUS FRUITS: PRODUCTION, FARM DISPOSITION, VALUE, AND UTILIZATION OF SALES, CROP SEASONS 1940-1947; BEARING ACREAGES, CROP SEASONS 1919-1947; BY CROPS AND STATES. Bureau of Agricultural Economics, October 1947. Mimeographed.

FATS AND OILS—SUPPLY AND DISPOSITION SPECIFIED PERIODS (ESTIMATED), OCTOBER 1, 1947-JULY 1, 1948. Production and Marketing Administration. Mimeographed. A statistical review.

ASPHALT FLOOR TILE. Special feature of Construction and Construction Material Industry Report, December 1947, Bureau of Foreign and Domestic Commerce. Processed. Largely statistical.

BONE CHAR REVIVIFICATION AND FILTRATION. By V. R. Deitz. A preliminary survey. 300-page report without number. Obtainable only from National Bureau of Standards, Washington 25, D. C. Price $3.00, by check payable to "Treasurer of the United States."

ACCIDENT-RECORD MANUAL FOR INDUSTRIAL PLANTS. Bureau of Labor Statistics, Bulletin 772. Price 10 cents. Contains an outline of simple and useful methods of accident recording and of use of such data for accident prevention. Also explains how to compute and use injury-frequency and severity rates and how to determine important causes of accidents.

PATENTS

Multi-Preparation Made to Contain Nicotinamide Ascorbate and other Vitamins—S. H. Fox, Birmingham and L. P. Opferman, East Detroit, Mich., to Gelatin Products Corp., Detroit, Mich. No. 2,433,688. Dec. 30, 1947.

Nuts Freed of Hulls and Skins During Passage Through Machine Fitted With Lower Endless Conveyor and Upper Rubbing Belt Traveling at Different Speeds—E. W. Bridge, Philadelphia, Pa. No. 2,433,730. Dec. 30, 1947.

Starch Conversion Sirups Spray-Dried to Approximately 0.5 Percent Moisture Content—H. H. Schopmeyer, Hammond, Ind. to American Maize-Products Co. No. 2,433,818. Dec. 30, 1947.

Low Butterfat Ice Cream Mix Made to Have Lactose Content of About 13 g. and Riboflavin Content of About 4 mg. per 160 g. of water—A. Leviton, Washington, D. C. to People of U.S.A. No. 2,433,850. Jan. 6, 1948

Potassium Acid Tartrate Recovered From Winery Residues Containing Other Solid Organic Materials—E. C. Pattee, Cincinnati, Ohio, to National Distillers Products Co. No. 2,433,864. Jan. 6, 1948.

Amino Acid Polypeptides Obtained by Enzymic Hydrolysis of Natural Protein Purified by Dialysis Through Semi-Permeable Membrane Against Distilled Water—K. A. J. Wretlind, Stockholm, Sweden. No. 2,433,879. Jan. 6, 1948.

Albumin Precipitated From Water Solution by Addition of Aliphatic Monohydric Alcohol of From 5 to 10 Carbon Atoms—W. L. Hughes, Jr., Boston, Mass., to the United States of America. No. 2,433,905. Jan. 6, 1948.

Pears Graded Photoelectrically According to Length—M. B. Gause, Yakima and E. O. Burling, Vancouver, Wash., to California Packing Corp., San Francisco, Calif. No. 2,433,946. Jan. 6, 1948.

Stable Provitamin D Made to Consist of Approximately 50 Percent 7-dehydrocholesterol and Approximately 50 Percent Cholesterol—H. R. Rosenberg and W. W. Woessner to E. I. du Pont de Nemours & Co., Wilmington, Del. No. 2,434,015. Jan. 6, 1948.

Bread Made From Dough Containing Completely Hydrolyzed Protein Material Consisting of Unseparated Amino Acids Including Cystine in Ratio of 1 Part of Protein Materials to 40,000 Parts of Flour by Weight in Dough—F. C. Weber, Eastchester, N. Y. No. 2,434,087. Jan. 6, 1948.

Grains Treated With 0.05 to 0.5 Percent by Weight of Gamma Alumina to Combat Insect Infestation—C. G. P. Feachem, Northwich, England to Imperial Chemical Industries, Ltd., No. 2,434,204. Jan. 6, 1948.

Levulose Made from Liquor Containing Complex Glucides of Inuline Type—P. Vergnaud and Jean Pigeot, Melle, France, to Les Usines de Melle, Saint-Leger-les-Melles, France. No. 2,434,235. Jan. 6, 1948.

Coffee Cakes Known As "Bear Claws" Mechanically Notched In Course of Continuous Production—L. C. Stiles, Seattle, Wash. No. 2,434,339. Jan. 13, 1948.

Canned, Commercially Sterile Salad Made to Consist of Light Pickled Base and Heat Stable, Emulsied Dressing Containing Egg Yolk and Edible Oil—J. R. Brehm, Auburn, N. Y. No. 2,434,388. Jan. 13, 1948.

Oleomargarine Mix Viscolized At Pressure Differential of From 200 to 500 psi. Preliminary to Filling Into Shipping Containers While Fluid—C. E. Nelson, Chicago, Ill. to Kraft Foods Co. No. 2,434,429. Jan. 13, 1948.

Poultry Slaughtered for Dry Picking by Manually Operated Mechanical Device—P. F. Riordan, Summit Hill, Pa. to F. S. Riordan, Lansford, Pa. No. 2,434,587. Jan. 13, 1948.

Vanillin Made From Liquor Containing Lignosulfonic Acid Compounds—J. R. Salvesen, D. L. Brink, and D. G. Diddams, Wausau, and P. Owzarski, Rothschild, Wis., to Salvo Chemical Corp., Rothschild, Wis. No. 2,434,626. Jan. 13, 1948.

Vitamin A Synthesized By Esterifying Chemical Compound Obtainable From Liver Oils—N. D. Embree and E. M. Shantz, Rochester, N. Y. to Distillation Products Inc., Rochester, N. Y. No. 2,434,687. Jan. 20, 1948.

Glutamic Acid Content of Hydrolyzed Protein Converted to Lactam Form Preliminary to Making Protein Hydrolysate Substantially Free of Glutamic Acid— H S. Olcott and J. C. Lewis, Berkeley, Calif., to United States of America. No. 2,434,715. Jan. 20, 1948.

Fat-Soluble Vitamin Concentrates Made From Vitamin-Containing Fish Oil in Presence of Antioxidant Concentrate of Vegetable Origin—L. O. Buxton, Newark, N. J. to Nopco Chemical Co., Harrison, N. J. No. 2,434,788. Jan. 20, 1948.

Vitamin Alcohol Separated from Vitamin Esters by Fractionating Fish Oils in Presence of Antioxidant Concentrate of Vegetable Origin—L. O. Buxton, Newark, N. J. to Nopco Chemical Co., Harrison, N. J. No. 2,434,789. Jan. 20, 1948.

Fatty Materials Stabilized Against Oxidative Deterioration By Use of Natural Antioxidant of Vegetable Origin—L. O. Buxton, Newark, and C. E. Dryden, East Orange, N. J. to Nopco Chemical Co., Harrison, N. J. No. 2,434,790. Jan. 20, 1948.

(Patents continued on page 220)

BASIC FLAVOR MATERIALS

FOR FOOD PRODUCTS MANUFACTURE

Solid Extracts

ST. JOHNS BREAD
SWEET ORANGE PEEL
LICORICE
FOENUGREEK
KOLA
MAPLE BASE
COFFEE

Oleoresins

CAPSICUM
GINGER
PAPRIKA
PARSLEY SEED
TONKA

ESSENTIAL OILS • AROMATIC CHEMICALS • SPICES
GUMS: TRAGACANTH, ARABIC, KARAYA, LOCUST

S. B. PENICK & COMPANY

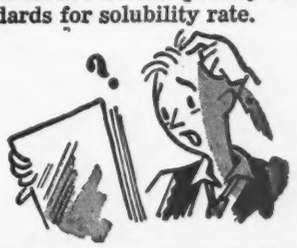
50 Church Street, New York 7, N. Y. Telephone: COrtlandt 7-1970
735 W. Division St., Chicago 10, Ill. Telephone: MOHawk 5651

TELL US MORE
Teacher!

● Maybe you're like a lot of food technologists and salt buyers who have gone along thinking all salt is the same. Actually, of course, various brands and grades and grains of salt differ in many respects.

Take solubility: In salting cheese, slow solubility is highly important and desirable. Otherwise, salt is lost in the whey, producing flat, under-salted cheese. On the other hand, in salting butter, salt must dissolve with lightning speed. If the butterfat is on the soft side—lacking in body—at certain seasons, butter salt must dissolve so quickly that over-working is avoided. Otherwise, the butter may lose its desirable physical properties and become mottled or marbled—and may lose its moisture, become leaky. Yet, if the salt is not properly dissolved, the butter may be gritty.

To meet these problems, we have set up definite solubility standards for Diamond Crystal Salt. Our Butter Salt, for example, dissolves completely in water at 65° F. in less than 9.8 seconds—average rate, 9.2 seconds. That is why so many quality-minded food processors have learned to depend on Diamond Crystal products, manufactured under strict quality-control standards for solubility rate.



Want Free Information On Salt? Write Us!

If salt solubility enters into your processing, write to our Technical Director. He will gladly recommend the correct Diamond Crystal Salt for best results. Diamond Crystal, Dept. J-12, St. Clair, Michigan.

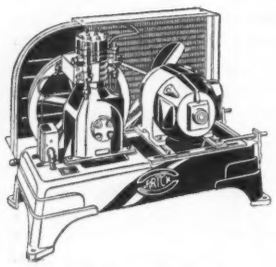
DIAMOND CRYSTAL ALBERGER PROCESS SALT

American Stores Co. Uses Over 650

TRADE FRICK MARK

Refrigerating Machines

Adequate cooling service plays an essential role in a big food store. That the Acme Markets use over 650 Frick refrigerating machines is a tribute to the ample capacity and dependability of this equipment. • Let us quote on your cooling needs.



Frick Low-pressure Refrigerating Unit

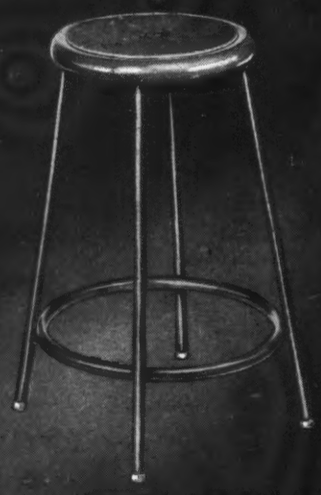
DEPENDABLE REFRIGERATION SINCE 1882

FRICK CO.

WAYNESBORO, PENNA. U.S.A.

HERE'S HOW ROYAL CHAIRS STEP UP PRODUCTION

Yes, Royal industrial chairs and stools will step up your production . . . by **reducing worker fatigue.** Clip the coupon now. Send for Royal's 16-page illustrated scientific seating guide and catalog. It's free.



MAIL THIS COUPON TODAY

Royal Metal Mfg. Co. DEPT. L
175 N. Michigan Ave., Chicago 1, Ill.

Please send me free your 16-page illustrated catalog and Scientific Seating Guide.

Name _____

Firm _____

Address _____

_____

Shown is Model No. 501-Stool. All welded tubular steel construction. Round steel seat with tempered Masonite top surface. Case hardened steel floor glides. Available in 8 heights—18" to 32". **10-year guarantee.**

REMEMBER:

A TIRED WORKER COSTS *MUCH* MORE THAN A GOOD CHAIR

ROYAL METAL MFG. CO. 175 N. Michigan Ave. - Chicago 1, Illinois

PATENTS

(*Continued from page* 219)

Diastase Extracted from Ground Wheat Separation of Wheat Gluten From Wheat Starch—I. W. Tucker and A. K. Balls, Washington, D. C., to United States of America. No. 2,434,874. Jan. 20, 1948.

Liquids Dehydrated by Electrostatic Heat—V. W. Sherman, Summit, N. J. to Federal Telephone and Radio Corp., New York. No. 2,434,966. Jan. 27, 1948.

Chocolate-Coated Confections Given Second Covering of Chocolate Coating Containing Reduced Cocoa Butter Content Ratio to Non-Fat Solids—H. R. Burbank, New York, and B. J. Zenlea, Ozone Park, Long Island, N. Y. to Rockwood & Co., Brooklyn, N. Y. No. 2,434,987. Jan. 27, 1948.

Ice Cream Sundae Packaged in Container With Permanently Closed Bottom and Tight Fitting Removable Cover—F. T. Moser, Hartford, Conn. No. 2,435,094. Jan. 27, 1948.

Natural Fats Containing Oleic Acid Glycerides Isomerized By Nitrous Acid In Presence of Acetone, Diacetone or Diacetone Alcohol—Wm. R. Eipper, Philadelphia, Pa. No. 2,435,208. Feb. 3, 1948.

Sugar Made to Have Desirable Maple Flavor and to be Suitable for Making of Fruit-Type Jelly Without Addition of Fruit Flavors—A. M. Zenzes, New York, one-half to Musher Foundation Inc., New York, No. 2,435,248. Feb. 3, 1948.

Concentrated Sugar Base Made From Syrup Film Removed From Surfaces of Raw Sugar Cane Crystals For Use As Table Syrup and In Making Fruit-Flavored Syrups and Jellies—A. M. Zenzes, New York, one-half to Musher Foundation, New York. No. 2,435,249. Feb. 3, 1948.

Fatty Acids Recovered From Cottonseed Oil Refining Foots—H. K. McClain, Wyoming, Ohio to Procter & Gamble Co. Cincinnati, Ohio. No. 2,435,456. Feb. 3, 1948.

Food Frozen in Trays During Passage in Vertical Plane Through Freezing Zone—V. C. Patterson, to York Corp., York Pa. No. 2,435,462. Feb. 3, 1948.

Frozen Material Dehydrated by Passing Current of Relatively Dry Inert Gas for Removal of Water Vapor About and on Surface of Frozen Material—O. Levinson and F. Oppenheimer, Chicago, Ill. to Michael Reese Research Foundation, 2,435,503. Feb. 3, 1948.

Moistened Grain Peeled By Action of Cooperating Resinous and Rubber Surfaces—W. W. Lewy, New York No. 2,435,592. Feb. 10, 1948.

Cream Whipped by Aerating Action of Non Acid Forming Gas—C. A. Getz, Glen Ellyn, Ill. to Aeration Processes, Inc., Columbus, Ohio. No. 2,435,682. Feb. 10, 1948.

Poultry Mechanically Assorted for Weight During Conveying—S. S. Barker, Ottumwa, Ia. No. 2,435,706. Feb. 10, 1948.

Flavors for Beverages and Food Made to Contain Lauryl Meta-Sodium Sulfobenzoate, Citrus Oil, Propylene Glycol, Ethyl Alcohol and Water—C. G. Hartman, Glendale, Mo. No. 2,435,744. Feb. 10, 1948.

Fats Hydrolyzed To Fatty Acids and Glycerine at Elevated Temperatures and Pressure—M. H. Ittner to Colgate-Palmolive-Peet Co., Jersey City, N. J. No. 2,435,745. Feb. 10, 1948.

Carrots, Okra, String Beans and Like Mechanically Clipped For Removal of Ends—W. E. Urschel, Valparaiso, Ind. No. 2,435,762. Feb. 10, 1948.

Bananas Converted to Powder By Drying Pulp to Plastic State on Heated Rolls and Further Drying in Current of Heated Air to Reduce Moisture Content Below 2 Percent—R. T. Northcutt, Westfield and R. T. Northcutt, Jr. Fanwood, N. J. to Food Concentrates, Inc., New York. No. 2,435,842. Feb. 10, 1948.

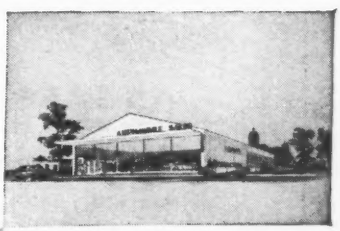
Semi-Liquid Starch Dispersion Made by Use of Sodium Benzoate, Zinc Stearate and Reaction Product of Stearic Acid and Triethanolamine—A. F. Peters, Philadelphia, Pa. No. 2,435,901. Feb. 10, 1948.

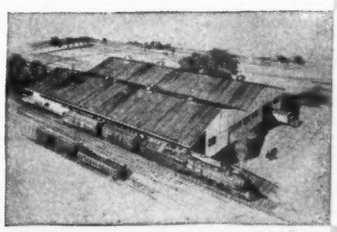
LURIA INDUSTRIAL BUILDINGS

NOW IN PRODUCTION

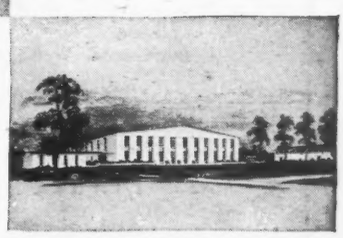
LURIA STANDARD BUILDINGS are permanent structures designed for maximum utility and flexibility. Large door openings, ample eave height and unobstructed clearance to the rafters make these buildings adaptable for innumerable uses. The unit system of expansion both in width and length combined with a choice in location of doors and sash provide unlimited variation in size and arrangement. These features allow a selection of combinations that are calculated to meet most individual requirements, thereby eliminating the expense of special engineering and gaining the benefit of production line economy. Simplicity of design featuring prefabricated frames of structural steel, insures easy handling and economical erection.

Corrugated steel sheets provide the most economical covering and are widely used with structural frame buildings. An additional feature of the Luria Structures is that they are designed to accommodate various types of collateral materials. This is important where requirements dictate the use of particular materials and also gives the advantage of greater freedom in architectural treatment.

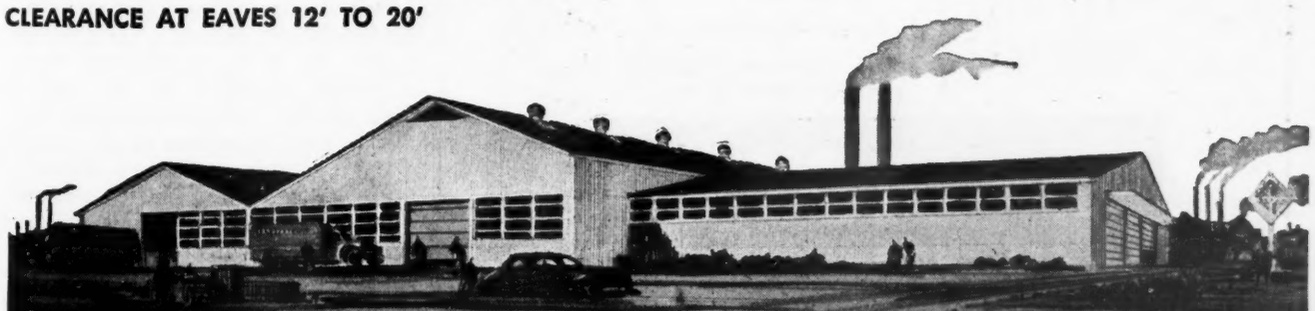




ADAPTATIONS OF STANDARD UNITS



BASIC UNIT WIDTHS 40′ TO 100′ CLEAR SPAN
LENGTH ADJUSTABLE IN INCREMENTS OF 20′
CLEARANCE AT EAVES 12′ TO 20′

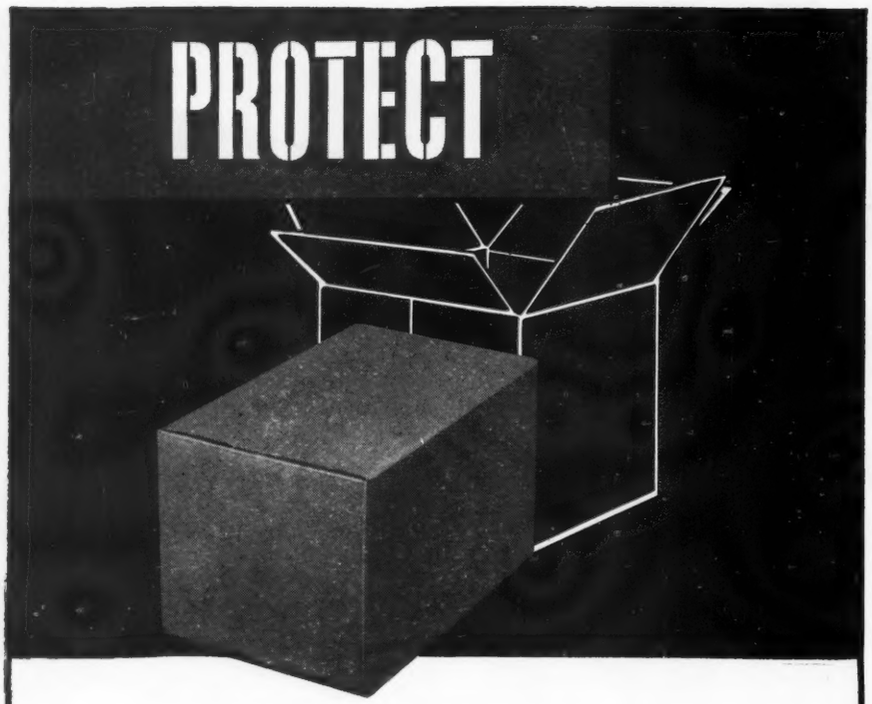


LURIA ENGINEERING CORPORATION

500 Fifth Avenue, New York 18, N. Y.

1734 Candler Bldg., Atlanta 3, Georgia

First National Bank Bldg., Chicago 3, Illinois



YOUR CONTAINER WITH FINDLEY'S CASE-SEALING ADHESIVES

You KNOW you are sending out strongly sealed containers that will reach their destination safely and with tightly sealed flaps when you use Findley Adhesives. Findley Sealing Glues grab and hold with a grip that won't let go, because the flaps are "welded" together along the entire area of contact — not merely joined in a few spots.

Findley offers a complete range of case sealing adhesives — tailored to all types of materials, production methods and conditions. Write, wire or phone today about any of your adhesive problems.

FINDLEY'S FIVE WAY ADHESIVE INSURANCE

1. Best available raw materials
2. Extensive laboratory facilities for research
3. Modern production facilities
4. Skilled technical service
5. Over 45 years of SERVICE AND SATISFACTION to Industry

Findley's INDUSTRIAL ADHESIVES exclusively

Plants At: Milwaukee and Houston
Sales Offices In: Chicago, Kansas City, New Orleans, Dallas, Houston and Ogden, Utah

THE F. G. FINDLEY COMPANY ◆ 3059 W. PEMBERTON AVENUE ◆ MILWAUKEE 10, WIS.

Fuel Saving

(*Continued from page* 107)

to remove any magnetic impurities. Non-corrosive screens are used which range in mesh from 0.111 in. to 0.0084 in. screen opening. At frequent intervals, samples of screened salt are taken for the purpose of checking the granulation and cleanliness. In this manner each grade of salt has a definite and uniform character, and must meet specifications set by management.

Corrosive-resistant metals are used extensively throughout this plant in the manufacture of evaporated salt.

The launder and electric vibrating conveyor in this system are monel metal. The filter screen on the drier is Stainless Steel. Many of the helical conveyors throughout the plant are monel lined, and the housing is constructed of monel metal.

In the Vacuum Pan process the filter screen on the driers is Stainless Steel. The agitators are constructed of bronze.

The open evaporating pan in the Alberger process has monel sides, while the hood is lined with sheet aluminum. The baskets in the centrifugals are monel. The rotary driers in this system are monel lined, except one, which is nickel-clad steel.

—End—

Lubrication

(*Continued from page* 118)

The physical condition of the valves, piston rings and stuffing boxes must also be considered in deciding upon the viscosity of oil to use. Practically as important as its lubricating properties will be the seal maintaining ability. If the cylinder walls and moving parts are in first-class condition, a straight mineral oil of from 150-300 seconds Saybolt viscosity at 100 deg. F. should give adequate lubrication.

In large machines or those where the cylinder walls are scored or rings are worn, an oil of somewhat higher viscosity may be essential to maintain the requisite seal and degree of compression. Under such conditions, an oil having a viscosity around 300 or even 500 seconds Saybolt at 100 deg. F. may give the best performance.

While the refrigerating unit is the most glamorous of the "back field" mechanisms required for

THE ONLY TOOL YOU NEED---

TO *Open* A

Nibcoloy

Lock Flange Joint

Pat. applied for

Simplest, Most Economical Method of Installing Demountable Alloy Piping.

To open a NIBCOLOY Lock Flange joint for inspection, cleaning, renewing gaskets, or to change the line itself, all you need is a few turns with a set screw wrench. For permanent installations the NIBCOLOY Lock Ring makes a quick, safe joint that is trouble-free and economical, reducing maintenance and first cost.

NIBCOLOY Wrot Fittings are precision-made, by a patented process, to close tolerances and highest quality standards. Available now, from 1/4" O.D. to 4" O.D. in Monel, Inconel, Nickel and Stainless Steel 304-347-316. Mail the coupon below or write now for catalog with detailed information, without obligation to you.

Send for Catalog...

illustrating the complete line of Nibcoloy Wrot Fittings in Nickel, Monel, Inconel, Stainless Steel 304, 347 and 316. Write us about your specific problems today.

NORTHERN INDIANA BRASS COMPANY

405 PLUM ST., ELKHART, INDIANA

Without obligation send us your Catalog 902 on NIBCOLOY WROT Fittings.

Name_____

Street_____

City_____ State_____

New! **TERRISS 3-SPEED**

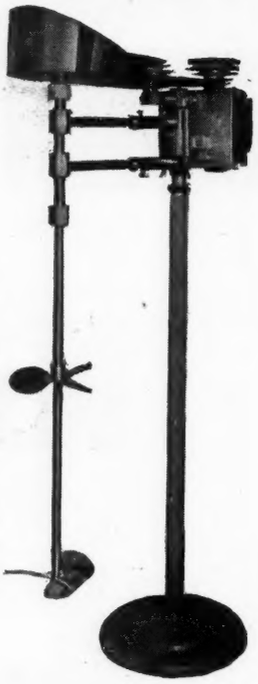
PORTABLE MIXER

STIRS • BLENDS
MIXES • AGITATES

No more carrying heavy mixer . . . clamping to tanks . . . breaking side walls.

The New TERRISS 3-Speed Portable Mixer is an all-around unit that will take care of all your mixing, blending and agitating problems. If your tank or vat is below floor level the TERRISS 3-Speed Mixer will reach down and do a real job for you. If your container sits on the floor, a little adjustment and the mixing begins. If your tank or container is high off the floor, the TERRISS Mixer will lift up and do the mixing job.

All parts that touch your product are Stainless Steel. Standard belt drive permits propeller speeds of 175 RPM, 325 RPM and 575 RPM. Other combinations are available with simple adjustments. Both propeller shaft and stand are adjustable, permitting unlimited settings to fit any job in your plant.



Send your order today . . . money-back guarantee.

CONSOLIDATED
SIPHON SUPPLY CO., INC.

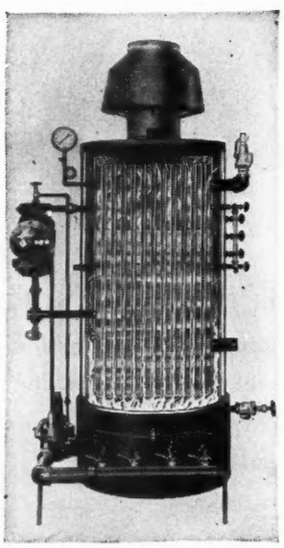
Dept. F, 22-24 Wooster St. **New York 13, N. Y.**

THE ANSWER TO YOUR STEAM PROBLEM

A KANE BOILER PACKAGE

Yes, it's a compact, self-contained steam source that includes: the correctly sized KANE Automatic Gas-Fired Boiler complete with burner and controls to maintain required steam pressure; and an M-K-O Automatic Boiler Feed system designed to return condensate and supply make-up water as required for highest operating efficiency.

Engineered Steam at its best with four decades of experience at your disposal—so, send your steam problem to us for study and recommendation.



The KANE Boiler is built to A.S.M.E. specifications, in sizes to 30 H.P.

MEARS-KANE-OFELDT INC.

1903-1915 EAST HAGERT STREET, PHILADELPHIA 25, PA.

FOUR DECADES OF AUTOMATIC GAS-FIRED BOILER MANUFACTURING EXPERIENCE.

frozen foods treatment, the "line" may include belt conveyors for freezer tunnel handling of packaged meats; the hydraulic jacks, plate suspension cables and door hinges of the quick-freezing unit; and the fans or blowers in a blast freezing installation.

To a varied degree these various mechanisms may be exposed to the freezing temperatures, in which case they present a lubrication problem because the lubricants must be chosen with care so that they will function properly when exposed to these temperatures.

The bearings of a freezer tunnel conveyor are a case in question. Here an average ambient temperature of around –20 deg. F. prevails. As the conveyor is usually of the belt type, it is carried on conveyor rolls or idlers which must turn freely at these temperatures—otherwise flow of the frozen packages may be retarded. It is most important to synchronize the rate of speed of the feeder conveyor with that of the freezer conveyor and the tail-off conveyor. The bearings of the feeder and tail-off conveyors will not cause much concern—they are located outside the freezer and any properly prepared ball or roller bearing grease will keep them running. In the freezer, however, we must consider the plasticity or shearing ability of the grease. It is not necessary for it to possess fluidity but it must shear or break away from itself readily so that there will be minimum starting and running torque.

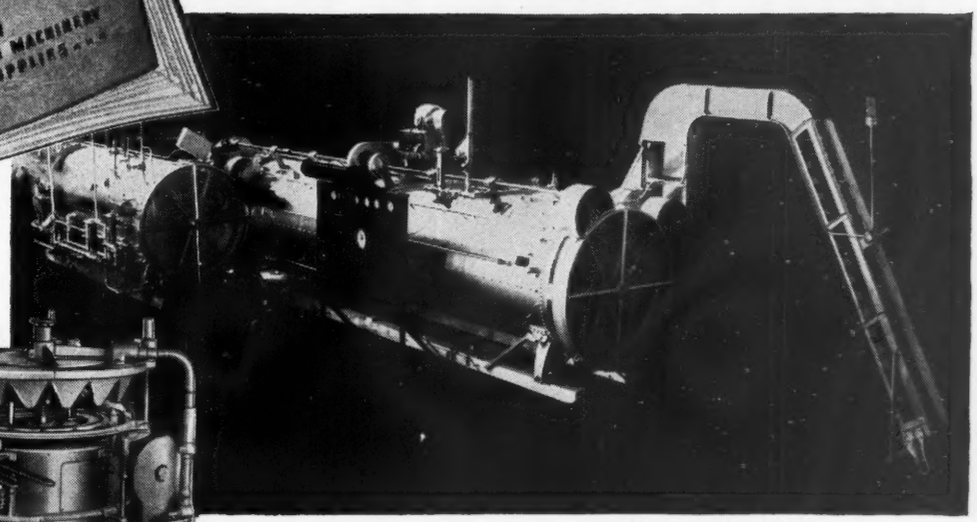
This characteristic has been carefully considered by the grease chemist when selecting the ingredients and planning the method of preparation. It is an inherent property of the modern mixed-base (sodium-lime soap) ball and roller bearing grease when an oil of sufficiently low viscosity is used and the grease is fortified by an antioxidant. This same grease is also suitable for the ball or roller bearings of blowers or fan in blast freezing.

Hydraulic jacks are used in multiplate freezers for raising and lowering the freezing trays. The hydraulic pump and motor along with the hydraulic oil tank can be located below the freezing unit with piping to the hydraulic lift cylinder, or the pump and motor can be installed so as to operate a battery of freezing units. This latter is conventional practice today in modern quick-freezing where the entire installation is a stationary plant.

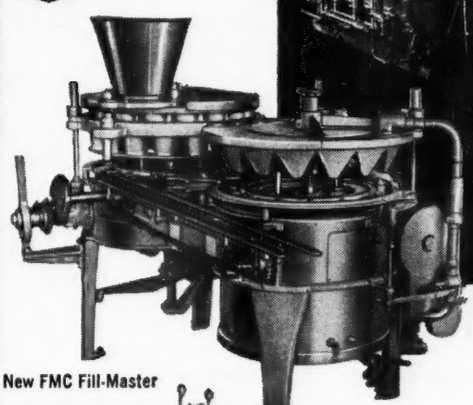
A comparatively low viscosity,

COST-CUTTING SUGGESTIONS...

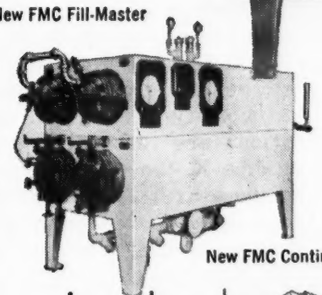
From the 260-Page FMC Catalog of PROCESSING, CANNING and WAREHOUSE EQUIPMENT



A-B Pressure Cooker & Cooler



New FMC Fill-Master



New FMC Continuous Juice Processor (Pasteurizer)

New FMC Case Sealer

Whether you pack Corn, Peas, Beans, Tomatoes, Fruits or any other products, you will find exactly the machines to fit YOUR needs in the FMC Catalog. Machines that have advanced features which assure better quality, speed up production and cut operating costs.

Consult your FMC Catalog also for the latest in Packaging, Labeling, Casing and Case-Sealing Equipment, and see for yourself how comprehensive these lines are. If you don't have the new FMC Catalog No. 800, write for it today.

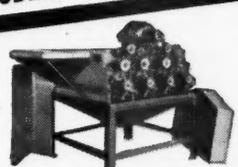
FIGHT MOUNTING COSTS with FMC MODERN MACHINERY

fmc FOOD MACHINERY CORPORATION

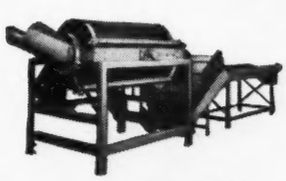
FOOD MACHINERY CORPORATION

SPRAGUE-SELLS DIVISION • HOOPESTON, ILLINOIS

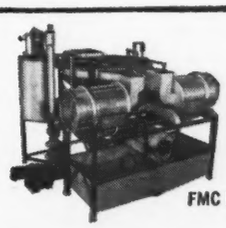
BALTIMORE • NEW YORK • SAN JOSE, CALIFORNIA (ANDERSON-BARNGROVER DIVISION)



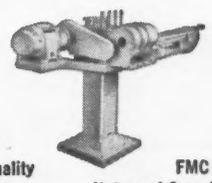
FMC Continuous Vegetable Peeler



FMC Bean Snipper

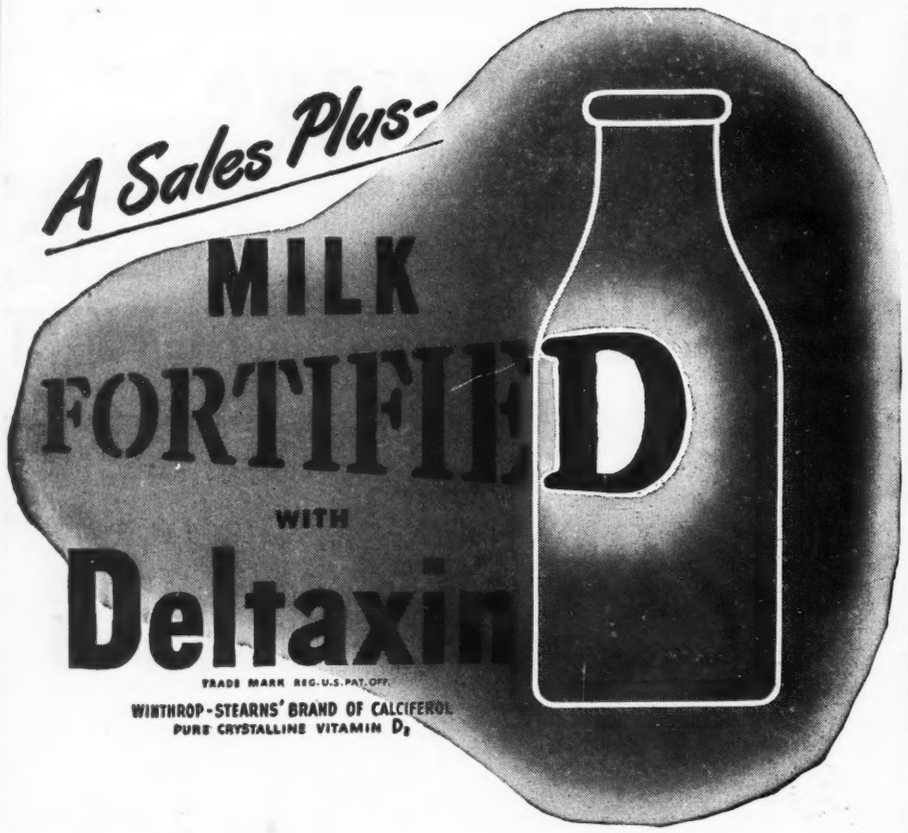


FMC Lewis Quality Grader



FMC No. 2 Universal Corn Cutter

D-400



Deltaxin, Winthrop-Stearns' brand of calciferol is pure crystalline vitamin D_2 with unvarying antirachitic potency. These crystals are dissolved in propylene glycol which mixes readily with milk and disperses uniformly even without homogenization.

Deltaxin in propylene glycol offers you these advantages:

PURITY . . . . . Deltaxin is the purest known form of vitamin D_2

ECONOMY . . . . . Costs less than one cent per 100 quarts of milk

CONVENIENCE . . . Simply measure and add, or use standardized container for batches of 1,000 gallons

ACCURACY . . . . . Tests made with regular milk (not homogenized) show complete dispersion throughout cream and skim layers.

The Council on Foods and Nutrition of the American Medical Association has declared Deltaxin in propylene glycol suitable for the fortification of Council accepted vitamin D milk.

Deltaxin is available as crystals or in oil solution for the fortification of other food products.

Winthrop-Stearns supplies pure crystalline vitamins, enrichment mixtures and amino acids to leading manufacturers throughout the Food Industry.

WINTHROP-STEARNS

Special Markets Division

WINTHROP-STEARNS Inc.

170 Varick Street, New York 13, N. Y.

Sole Manufacturer under U. S. Patents 1,902,785 and 2,030,792

very highly refined hydraulic oil of from 100 to 150 seconds Saybolt Universal viscosity at 100 deg. F. is preferred. Such an oil should be fortified with rust and oxidation inhibitors to give maximum protection to the pump and motor mechanisms and other parts against rust and to retard development of oxidation products in the oil which might cause formation of gums and lacquers.

—End—

Chocolate

(*Continued from page* 93)

on the surface of the stream of chocolate as it flows from the tempering kettle into the discharge chute to the molding machine or depositor.

Holding for use after tempering requires a precaution to prevent the chocolate from becoming too thick and unmanageable because of too rapid crystallization of its fat content. If the tempered chocolate is to be held in the tempering kettle for more than a very few minutes, the cooling water should be shut off and a little steam released into the kettle jacket to raise the chocolate temperature slightly—not enough to remelt the fat crystals which have started to form but enough to retard further crystal formation.

When a tempering kettle of 600-lb. capacity is used and water conditions are reasonably uniform at 60 deg. F. the following prescribed temperatures and time intervals may be followed with reasonable assurance that correct tempering will be obtained.

Tempering Procedures

For average dark chocolate of 34-37 percent total cocoa butter content, cool to 88-89 deg. F. in 30 min. Raise to 90.5 deg. F. over a period of 20 min. if chocolate is to be held in tempered state.

For milk chocolate not finely milled, of 33-36 percent cocoa fat content and with less than 15 percent whole milk content, cool to 86-87 deg. F. over a period of 30 min. Raise to 89 deg. F. over a period of 20 min. if it is to be held in tempered state.

Milk chocolate finely milled, of 31-34 percent cocoa fat content and with more than 15 percent whole milk content, cool to 85-86 deg. F. over a period of 30 min. Raise to 88 deg. F. over a period of 30 min. if it is to be held in tempered state.

Why not design for beauty and permanence? Stainless Steel is in better supply than carbon steel—you can get ALLEGHENY METAL, and we produce it in every form or shape you may need.

Complete technical and fabricating data—engineering help, too—yours for the asking.

ALLEGHENY LUDLUM STEEL CORPORATION

PITTSBURGH, PENNA. • OFFICES IN PRINCIPAL CITIES

Allegheny Metal is stocked by all Jos. T. Ryerson & Son, Inc. Warehouses

Use the NEW Dings
ALNICO MAGNET
PERMA•PULLEY*

• Here's the modern, low cost, positive way to remove tramp iron from materials carried on conveyor belts. No wiring . . . no electrical accessories . . . no operating cost . . . no maintenance . . . good for life . . . tremendous power . . . completely automatic — The new Dings PERMA-PULLEY is a revolutionary contribution to magnetic separation. You can install it and forget it!

Backed by 50 years of magnetic separator manufacturing experience, this new pulley offers these plus features that assure you of maximum tramp iron removal:

- **Extra high strength grade of Alnico**
- **Closely spaced poles**
- **Magnetic strength equal across entire belt width**
- **Crowned face to prevent belt weave**
- **Extremely high surface strength**

Dings PERMA-PULLEYS are available in 53 sizes with shaft diameters to suit your requirements. Fully described in NEW BULLETIN No. 260-A which includes comparative Magnetic Strength Curve proving that you get greater protection with DINGS! Send for a copy.

DINGS MAGNETIC SEPARATOR CO.
4741 W. McGeogh Ave., Milwaukee 14, Wis.

***MOST POWERFUL NON-ELECTRIC PULLEY ON THE MARKET!**

Dings offers you the most powerful magnetic pulleys for the job:

1. For burden depths up to two inches — The Dings *Perma-Pulley* with its extremely high surface strength.

2. For burden depths over two inches — The Dings "High-Intensity" Electromagnetic Pulley with its great depth of magnetic penetration.

Dings
"HIGH INTENSITY"

MAGNETIC PERMANENCE GUARANTEED *for life!*

These prescribed conditions cover the chocolate coatings on which specific instructions are given to new operators on tempering kettles. Special instructions are given for other coatings they may temper on infrequent occasions.

Since it is not feasible to formulate prescribed conditions for all variations in chocolate coatings usually tempered, the running of a test sample at the prescribed temperature is the recommended practice when in doubt. If the results obtained in the test are not satisfactory, a visual examination of the sample will usually disclose the cause of the difficulty and adjustments in procedure can be made

Training of a new tempering operator is as important, if not more important, than the type or kind of temperature indicator or thermometer he uses. The instrument should be correctly calibrated.

—End—

Aluminum Cans

(*Continued from page* **95**)

Vegetables have been canned successfully in anodized, lacquered or anodized-lacquered aluminum cans that have been stamped from treated strips. These same types of cans have been used in Norway also for meat products. In many cases, it was found that the quality of meats packed in these cans was superior to that of meats in tinplate cans.

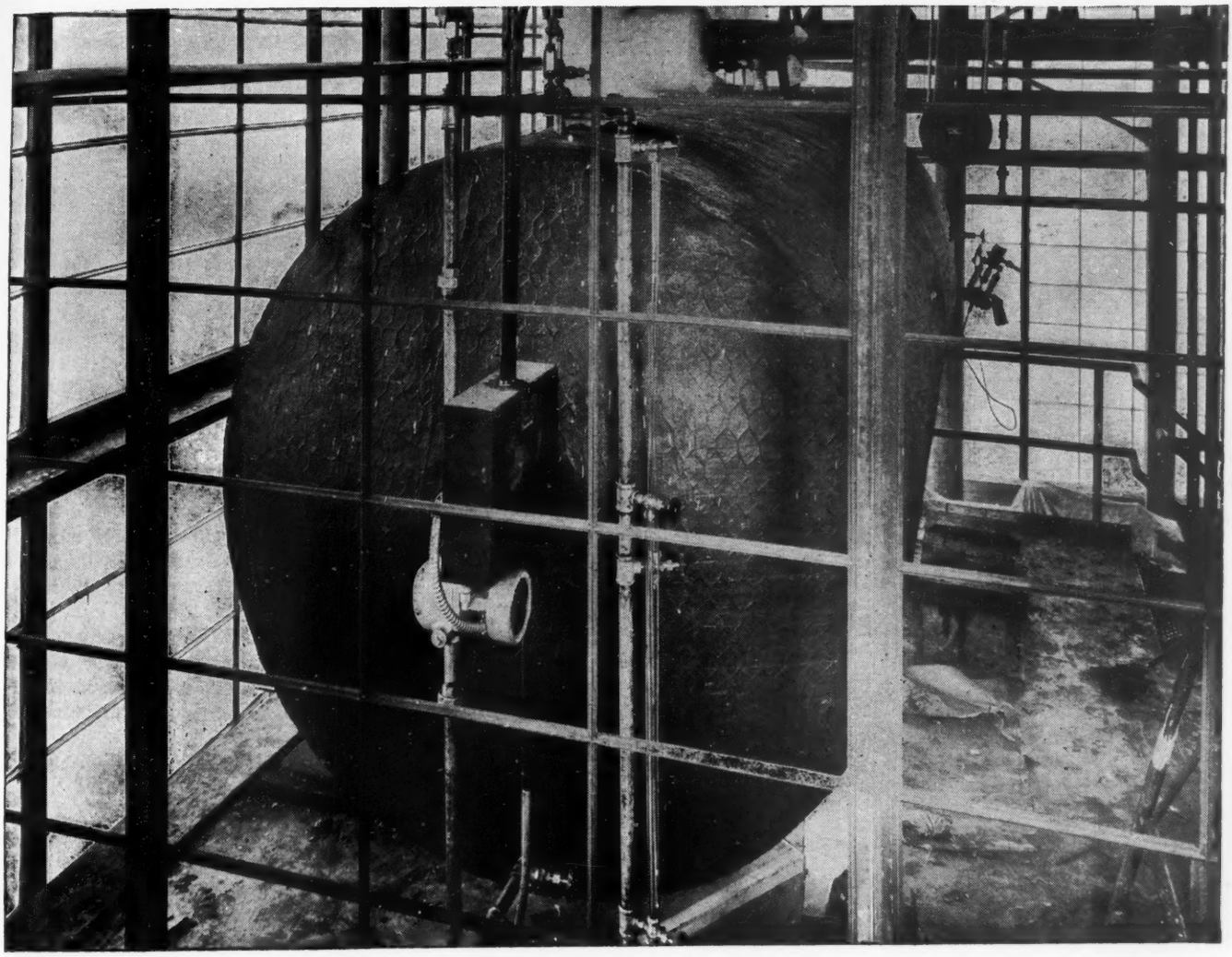
Fish canning industries in Europe have had satisfactory results packing wet products like cod roe, fish cakes and fish balls in anodized aluminum cans.

Since aluminum cans are soft, they must be handled more carefully than tinplate cans to prevent "caving in" as well as leaking caused by damage to the end seams. Careful handling is essential in canneries before and after the cans are filled and processed and while they are packed and shipped.

To increase the strength of the aluminum cans, the European countries are using corrugated lids and bottoms. Additional strength is provided for the larger cans by making them from thicker strips.

The A/S Nordisk Aluminumindustri has conducted extensive tests to develop suitable shipping containers for products canned in aluminum. Special attention was given to the 900 ml. cans, since these cans damage easily.

After subjecting various types of cases and cartons containing 24



FIBERGLAS*

. . . barricade for boilers' wayward BTU's

Here's one hot-water reserve boiler that can be depended upon to deliver *hot* water—economically!

It's Fiberglas-insulated—to confine working BTU's where they'll do a useful, fuel-saving job.

Fiberglas Insulating Blankets are proving their ability to save money in many of the country's important plants—on boilers, breachings, retorts, industrial ovens, ducts—and a long list of specialized processing equipment.

The high thermal insulating efficiency of Fiberglas results from the countless tiny air spaces enclosed in a lightweight, wool-like blanket of long, fine fibers of glass. Here is a material that will not burn, rot or decay—is non-corrosive and will not corrode metals. Fiberglas insulation holds together, is resilient, will not settle under vibration.

This basic material is further processed into blankets that meet the requirements of industry for insulating hot surfaces up to 1000°F. In the illustration, above, Fiberglas insulation has been fabricated with a wire mesh exterior surface to facilitate application and provide a base for mastic finish.

Get all the facts about Fiberglas blankets—their many forms and uses. Write for "Fiberglas Insulations for Industry" . . . Owens-Corning Fiberglas Corporation, Dept. 2009, Toledo 1, Ohio. Branches in principal cities.

In Canada: Fiberglas Canada Ltd., Toronto, Ontario.

OWENS-CORNING
FIBERGLAS
Reg. U.S. Pat. Off.

THERMAL INSULATING MATERIALS

*FIBERGLAS is the trade-mark (Reg. U. S. Pat. Off.) for a variety of products made of or with glass fibers by Owens-Corning Fiberglas Corporation.

Disc jockey, grocer, farmer—all find speed pays

Transcriptions and radio scripts move regularly by Air Express. In the radio business, *speed pays.*

Frozen foods, as well as food equipment parts, represent a big share of Air Express business. Food industries find *speed pays.*

Even baby chicks—in countless numbers—travel this fastest way. In any kind of business, *speed pays.*

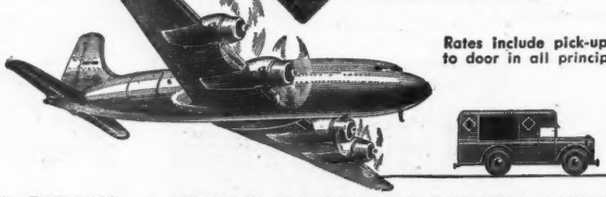
Speed pays in your business, too!

Air Express is the fastest possible way to ship or receive. Goes on all flights of Scheduled Airlines. Door-to-door service, no extra cost. And rates are low: 35 lbs. goes 800 miles for only $8.60. 15 lbs. for $3.80. Use it regularly. Phone local Air Express Division, Railway Express Agency, for fast shipping action.

- Low rates—special pick-up and delivery in principal U. S. towns and cities at no extra cost.
- Moves on all flights of all Scheduled Airlines.
- Air-rail between 22,000 off-airline offices.

AIR EXPRESS

AIR EXPRESS GETS THERE FIRST



Rates include pick-up and delivery door to door in all principal towns and cities

AIR EXPRESS, A SERVICE OF RAILWAY EXPRESS AGENCY AND THE

SCHEDULED AIRLINES OF THE U. S.

900 ml. cans to drop tests and shipping tests, two styles of cases or cartons were found to be satisfactory. Even under rough handling, not more than 10 percent of the cans were damaged.

One of these cartons (or wooden cases) is reasonable in price and easy to pack. It is packed with cans placed in tubes of corrugated fiberboard. Six cans are packed in each tube, with the corrugations of the tube on the inside, toward the cans. The tubes are No. 3 corrugated, single face, fiberboard material, size 500 x 500 mm. Four of these tubes are packed in each case or carton between "case cardboard 3" partitions (300 x 406 mm.).

The tubes can be packed in an ordinary wooden case or in a carton made of "double-double case cardboard 6," or in a solid cardboard carton (2 mm. or greater). Inside dimensions of the case or cartons are 408 x 297 x 297 mm. Excellent results have been obtained also with cartons made of "case cardboard No. 3 kraft," using case cardboard No. 1 inserts.

The second type of carton (or wooden case) has perforated inserts and is more expensive. The cans are freely and securely supported in eight perforated inserts that hold three cans each. The inserts are made of solid 1 mm. cardboard, 511 x 276 mm., with 135 mm. diameter holes. When the inserts have been filled with cans, they are packed either in ordinary wooden cases, "double-double case cardboard 6" cartons or in solid cardboard cartons (2 mm. or over). Inside dimensions of the case or cartons are 455 x 320 x 280 mm. When these inserts are used, the labels on the cans must not extend beyond the shoulder of the can. Otherwise, the labels will be torn in packing.

—End—

Yeast Estimation

(*Continued from page* 121)

form consistency. Methods for moisture determinations, rapid and accurate enough to keep pace with a rapidly moving yeast cutting line, are not known. Since bakers use compressed yeast by count of pounds, variations in yeast dry substance per pound will induce variations in dough fermentation times and degree which are undesirable in a mechanized bakery. Such variations may also imply small variations in yeast quality that are ficti-

BETTER PACKAGING MEANS BETTER PROTECTION SAYS MR. CELLOPHANE

SYLVANIA CELLOPHANE has the qualities so necessary for distinctive packaging. Every step in its manufacture is carefully checked. This careful control assures not only uniform transparency and a good printing surface, but also the high degree of dust, grease and water vapor protection . . . the low temperature durability and heat sealing qualities that make it outstanding in so many fields.

Folding tray plus heat-sealed overwrap produce an inexpensive package designed to preserve doughnuts at peak quality and appearance.

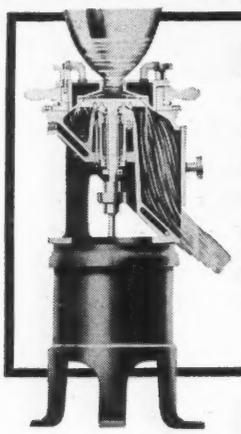
SYLVANIA CELLOPHANE

SYLVANIA DIVISION AMERICAN VISCOSE CORPORATION

Manufacturers of cellophane and other cellulose products since 1929

General Sales Office: 350 Fifth Avenue, New York 1, N. Y. *Plant:* Fredericksburg, Va.

Partial check list of fields served by Premier



What's in this Premier Colloid Mill?

This cutaway view shows the simplicity of its design . . . its rugged rotor (only moving part) . . . its husky bearing construction . . . its micrometer adjustment of clearances . . . its accurate centering of rotor in stator. *To sum up;* What is designed into and built into a Premier Colloid Mill assures hydraulic shearing action at its best.

What's in it for executives in charge of processing?

For one thing: Better Products More Profitably Processed . . . for another; Increased Production at Lower Cost. The efficient, economical Premier Colloid Mill, widely accepted by users in many fields as a versatile, adaptable means of better dispersions, does these jobs in many industries;

Dispersing solids in liquids and liquids in liquids, Premier insures more finely divided colloidal suspensions and promotes immediate chemical reaction . . . *Disintegrating* solid particles or the fibre and cellulose in animal or vegetable tissue — instantly exposing these particles to wetting or extractive action of suspending liquid . . . *Emulsifying* — achieving non-separating emulsions of all viscosities . . . *Homogenizing* — assuring superior homogenized products by compelling uniform distribution of the dispersed phase throughout the mix.

Whatever your plant processing requirements, write for our descriptive catalog using the coupon below. If you have special processing problems involving colloidal suspensions, write us and let us tell you how a Premier can help you.

PREMIER

PREMIER MILL CORPORATION
104 Genesee Street, Geneva, N. Y.

SEND DESCRIPTIVE CATALOG

NAME_____ TITLE_____

COMPANY_____

ADDRESS_____

FLUID_____

tious when differences in yeast dry substance are taken into account.

It is economically important to both manufacturer and user of yeast that it contain a unifom activity per lb. An approximate way of doing this is to keep the yeast dry substance per lb. the same, at least for the same lot.

Selection of a yeast of standard consistency as the base for using Montgomery and White's viscometric methods should be made with some care. Consistency is commonly judged by feel after adding measured amounts of water and plasticizing materials (vegetable oils and emulsions of synthetic glycerides) to a weighed amount of yeast from the filter presses. The quantity of water and plasticizer required will obviously vary with the degree of dryness obtained during filter pressing. It also varies with the age and temperature of the yeast, the raw material and conditions of the fermentation, the kind and condition of cutting machinery and trade practices. It is conceivable, therefore, that standard consistency will vary from factory to factory, and in different localities, and that there will be occasional departures from the normal consistency-solids relation.

The viscometric method is likely to be less useful for brewery work, even for pressed brewers' yeast, since it requires uniform suspensions, and these are difficult to obtain with brewers' yeast. By careful screening through a 100-150 mesh screen, brewers' yeast suspensions could be obtained that would yield satisfactory viscometer readings. The relation between cell-numbers and viscometer reading would have to be established, however, and the presence of non-yeast solids might lead to a factor with a large error. For determinations of solids in pressed yeast, the viscometric method, though one of satisfactory precision, can yield no more accurate results than the accuracy of sampling.

Turbidimetric methods have proved satisfactory for measurement of numbers of microorganisms in suspensions of them. They have been widely used for the determination of the amount of growth of lactobacilli used in vitamin and amino acid determinations. The methods presuppose a clear, colorless, or uniformly colored medium whose blank reading on a turbidimeter remains unchanged throughout the incubation or growth period. Yeasts grown in media with these characteristics

CONTINUOUS
INSECT CONTROL
WITH
ENTOLETER
CENTRIFUGAL MACHINES
DESCRIPTION OF THE "ENTOLETER"
SYSTEM IN USE IN HUNDREDS OF
FLOUR MILLS AND FOOD PLANTS
● CONTINUOUS DESTRUCTION OF ALL INSECT LIFE
● EASILY INSTALLED, INEXPENSIVE TO OPERATE
● IMPROVED FRAGMENT CONTROL FOR GRAIN & OTHER MATERIALS
● MODERN PLANT SANITATION & PROTECTION TO FOOD PRODUCTS

Send

FOR YOUR COPY...

ENTOLETER DIVISION
The Safety Car Heating and Lighting Co., Inc.
P. O. Box 904, New Haven 4, Conn.

Send full information on "ENTOLETER" Continuous Insect Control System.

Name.....

Company.....

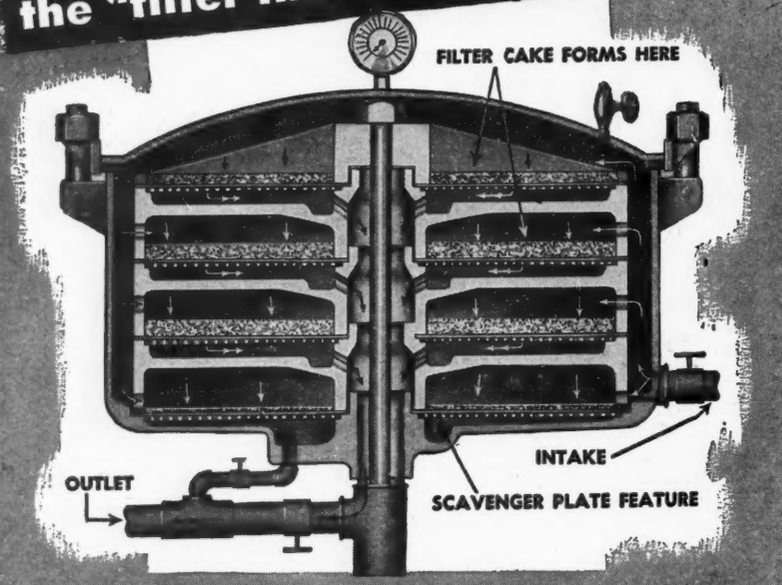
Address.....

City, Zone and State.....

the *horizontal plate* principle

makes SPARKLER

the "filter that filters all liquids"



SPARKLER

horizontal plate

FILTERS

. . . here's the story:

A FEW OF MANY PRODUCTS THAT CAN BE FILTERED WITH SPARKLERS

Acids
Alcohols
Alkalis
Beverages
Candy scrap
Caustics
Chemicals
Cleaning fluids
Extracts
Flavors
Gums
Hydraulic fluids
Lubricants
Milk
Molasses
Oils
Pharmaceuticals
Plating solutions
Resins
Shellacs
Soap, liquid
Syrups
Varnishes
Water
Wines

★ Sparkler Horizontal Plate Filters handle any liquid from heavy varnishes to light alcohols.

★ Equally efficient performance on intermittent or continuous operation, under a wide range of temperature, pressure and viscosity conditions.

★ Equally effective whether removing carbons and contact clays or clarifying and polishing with filter aids.

★ Patented Scavenger Plate permits *complete* batch filtration. (It's virtually an auxilliary filter with an independent control valve.)

★ Unexcelled filter cake stability — no slipping or breaking.

. . . why?

Because filter media are supported on a horizontal plane and filter aids floated into position uniformly; filtration takes place uniformly over entire filtering areas. Flow through filter is always *with* gravity.

Sparkler Filtration Is *Engineered* Filtration—we invite correspondence on your problem. You will receive the advice of filtration scientists with a quarter of a century of experience in a specific field.

SPARKLER MANUFACTURING COMPANY

MUNDELEIN, ILLINOIS

can be determined equally well, but beer wort, or the molasses wort of yeast factories, cannot be assumed to be the same from batch to batch, nor to remain constant in color value during the growth of the yeast. A turbidimeter does not distinguish between yeast and non-yeast particles, so on beer yeast samples its indication of yeast solids can be widely variant from the truth.

Two quick methods for determination of moistures in food products have not been generally applied to yeast. The Bidwell-Sterling, or other azeotropic distillation procedure, may be used for moisture determinations on pressed yeast or on suspensions relatively high in solids. By this method the moisture is distilled from the yeast by heating it in a hydrocarbon solvent, usually toluene, and receiving the mixed toluene and water condensate in a graduated receiver. As the water separates from the toluene its volume can be read directly, and the percent in the sample calculated. If used on suspensions containing only one or two percent yeast solids, the value obtained will be a small difference between relatively large numbers and might easily be in error by 100 percent.

A distillation moisture measurement may be made in ½ hr. or less. Where a high degree of accuracy is needed, the ratio of the values obtained for solids by distillation to those obtained by one of the drying methods should be determined and recorded.

Titration of moistures in a large variety of materials, using the Karl Fischer apparatus and reagents, has been successful. The method is fast and accurate, but requires special glassware for rigidly excluding moisture from the reagents and electrical equipment for determining the endpoint. Laboratories having Karl Fischer equipment for other purposes should be able to use it for moisture determinations on yeast as well. The results on yeast suspensions of low solids content are subject to the same errors as those by distillation measurements.

Areometric methods of measuring yeast solids in suspension have been suggested from time to time. They depend on measurement of specific gravity, usually with a hydrometer, on yeast suspensions and on liquid remaining after centrifuging or filtering off the yeast.

On the assumption that the specific gravity of the yeast suspension is an additive function of the specific gravity of the yeast solids and of the fluid in which the cells

CHEVROLET

NEW CHEVROLET ADVANCE-DESIGN '48 TRUCKS ARE LOWEST IN PRICE!

and have *all* these new and finer features

Here are the *newest* trucks—the *latest* and the *greatest* features—the *biggest* values—with the *lowest prices* in the volume field! Model for model, and with comparable equipment and specifications, Chevrolet Trucks *list for less* than competitive makes—some models *as much as $150!* Here is Advance-Design that provides the cab that "breathes,"* Flexi-Mounted Cab, Uniweld all-steel cab construction, fully adjustable seat, all-round visibility with rear-corner windows,* extra-durable frames, specially designed brakes, and many other features that put Chevrolet trucks far ahead of the field. See them at your Chevrolet dealer's.

CHEVROLET MOTOR DIVISION, GENERAL MOTORS CORPORATION
DETROIT 2, MICHIGAN

*Fresh air heating and ventilating system and rear corner windows optional at extra cost.

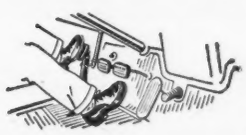
NEW CHEVROLET 4-SPEED SYNCHRO-MESH TRUCK TRANSMISSION

This Chevrolet-developed Synchro-Mesh transmission in heavy-duty models provides new ease and efficiency.

NEW CHEVROLET ADVANCE-DESIGN GEARSHIFT CONTROL

Steering-column gear shift (on models having 3-speed transmission) gives new freedom to the driver, leaves cab floor unobstructed.

NEW FOOT-OPERATED PARKING BRAKE



Chevrolet's foot-operated parking brake (on models with 3-speed transmission) provides new clear floor area.

NEW IMPROVED CHEVROLET VALVE-IN-HEAD ENGINE

The world's most economical engine for its size. Has greater durability and operating efficiency.

NEW MULTIPLE-FEATURE DEVELOPMENTS

New splined rear-axle shaft attachment to wheel hubs in heavy-duty models. . . . Heavier springs . . . New propeller shaft bearing-support and seal design.

are suspended, it is possible to calculate the yeast solids present, provided their specific gravity is known. While the specific gravity of any given mass of dried yeast solids can easily be determined, the result obtained cannot be applied safely to lots of yeast solids of different composition dried in other ways. Nor can it be assumed that the dry substance in a yeast cell always holds the same amount of water,[4] so that there is no reason to believe that it always affects the specific gravity of a yeast suspension in the same way. For these reasons, areometric measurements are not generally applicable for accurate solids determinations of yeast suspensions, though they may be usefully applied to particular fermentation where their relation to solids determined by more general method has been obtained.

References

1. A.S.B.C., 11th Annual Proceedings, 126-31, 1946.
2. John White, "A Critical Survey of Methods for the Determination of Yeast Quantity," *American Brewer*, 40-46; 70-71, August, 1947.
3. E. A. V. Montgomery and John White, "Estimation of Yeast Quantity by a Viscometric Method," *Journal of the Institute of Brewing*, vol. 52, 136-38, 1946.
4. John White, "Structure and Consistency of Yeast," *American Brewer*, 32-35; 61-62, February, 1947.

. . sure it can be done profitably and we've got 60 years of data to prove it!

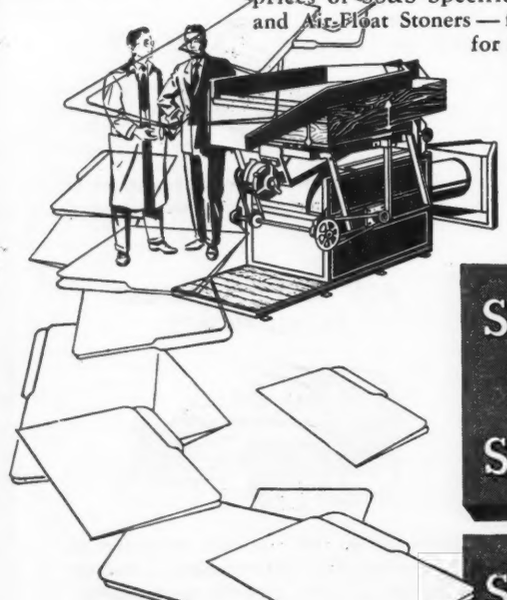
Eliminate hand-picking entirely? No, but *reduce it as much as 85%.* And we have reams of unsolicited testimonials which prove that installation of Sutton, Steele and Steele Specific Gravity Separators and Air-Float Stoners can turn the toughest dry commodity separating problem from a money-losing hand-picking operation to a profitable high capacity mechanical process.

Nebraska packer — *"On a single lot of only 100 bags of beans cleaned over your Specific Gravity Separator we were able to remove 700 lbs. of worthless material at a net profit of $42.00 on the lot over the hand-picking cost."*

Wisconsin seed house — *"We have been running our SS&S machine on all varieties of seed peas, and I do not believe that we could get along without the Specific Gravity Separator. It has paid for itself many times by reducing our cost of hand-picking."*

Georgia peanut company — *"Your Separator saves us a minimum of $8.00 per day, separating small unshelled peanuts that are practically the same size of normal size kernels."*

Wherever hand-picking is a bad influence on profit, there's an SS&S solution. Write today for details on varied applications, specifications, and prices of SS&S Specific Gravity Separators and Air-Float Stoners — first for 60 years! Ask for Bulletin FI-448



SUTTON, STEELE & STEELE, INC.

DALLAS, TEXAS, U.S.A.

Sixty Years of Specialized Experience in Separations

Dallas, Chicago, Des Moines, Minneapolis, New York City, Pittsburgh, San Francisco, Columbus, Ga.; Jackson, Mich.

Foreign: Winnipeg, Canada; Sao Paulo, Brazil; London, England.

MORE MARMALADE is cut with

The "Turnbull" type ORANGE PEEL CHIPPING MACHINE manufactured by Wm. Brierley, Collier & Hartley, Ltd., Rochdale, England.

Write for details.

Distributed by

BROWN BOGGS

Foundry & Machine Co. Ltd.

HAMILTON, ONT.